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MASSACHUSETTS INSTITUTE OF TECHNOLOGY

LINCOLN LABORATORY

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ABSTRACT

The Haystack Pointing System, implemented on the Univac 490 computer, is comprised of some thirty odd subprograms which go to make up an operating system and a utility system. The domain of this memorandum is limited to the description of the control of the operating system as vested in the master control and timing programs and in the computer itself via its external and internal interrupt capabilities. In the discussion of the programmed control function are included the real-time and simulation modes of the system, the man-machine communication scheme, the experiment set-up procedures, a step by step description of the entire system cycle, the plug-in program concept as utilized in connection with the celestial computation programs and data processing programs as well as other system facets as they relate to control.

In addition,certain procedural matters which bear on the control structure are discussed.

Accepted for the Air Force
Franklin C. Hudson
Chief, Lincoln Laboratory Office

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I. INTRODUCTION

The Haystack Pointing program system consists of an operating system and a utility system. The primary purpose of this memorandum is the description of the control of the operating system as vested in the control and timing programs and in the computer itself. Procedural matters which relate to this control are also discussed.

A word on the utility system is in order, for it is almost as important to the successful running of the Haystack system as the operating system. A programmer who writes a new program for the pointing system or modifies an old one first compiles his deck obtaining a relocatable machine language version on binary tape. This program is then added to (or replaces the obsolete version in a stack of) like programs on magnetic tape, of which there are three: in-core, celestial, and data processing. A single tape called the Master Bootstrap Tape is then made up with all the programs properly relocated and linked. This tape is the one read into the computer to begin the operating system (see Reference 1). In order for a program to fit into the operating system, it must follow certain rules that are laid down herein.

The computer is a Univac 490 Real-Time Computer. This machine has 32,768 words of magnetic core memory, each word being 30 bits long including sign. The average instruction time is 10 μs. The instruction repertoire consists of 62 basic single precision arithmetic commands, logical commands, and control orders. Each instruction is subject to modifications of control and address, making a versatile structure of some 25,000 effectively different commands.

It is in the in-out system, however, that the Univac 490 is eminently suitable as an antenna pointing computer. It has buffered input and output on 14 channels, with or without interrupt as desired on completion of the operation. Interrupts may also be generated by the external equipment. The ordering of input, output, interrupt, and channel is done on a priority basis.

The master control program, MCP, in the operating system has the task of synchronizing the system with the real external world, of sequencing the programs properly in response to the demands of an experimenter, and of providing the necessary link

between the computer programs and the man-machine communication system. The first job is accomplished by keeping track of real time* and tying the main computation cycle to an internal interrupt caused by the periodic emptying of a set of computed antenna positions (actually azimuths) from their core storage. The second task involves finding out what the experimenter wants to do, reading in the necessary program(s) from the Master Bootstrap Tape, initializing the system, and starting the main computation cycle. The communication link that is provided is primarily a device for matching the computer speed against that of an operator without noticeable delay or frustration on the part of either machine or man.

Before plunging into the details of this system, mention should be made of the fact that not only does the system attempt to point the Haystack antenna at a variety of objects in the sky to a precision of better than 1" of arc in real time, but it can operate in a non-real time simulated mode. In this latter mode, the output is not a command to the antenna, but a set of points to be printed. Thus, for example, look angles at hourly intervals for a planet for a year may be computed and recorded on magnetic tape in little over half an hour. To be useful, they of course, have to be printed, which, in this example, takes about one hour on the 490.

II. INPUT-OUTPUT

The details of the input-output system are more thoroughly covered in Reference 2 than here, but enough is covered to give an overall feel.

There are 14 input and 14 output channels, with transfers taking place on a buffered basis. Each transfer takes two memory cycles or 12 μs from the main frame, and ties up the input-output equipment for 18 μs. Thus, the maximum transfer rate on all channels is slightly over one and a half million bits per second. The actual rate of transfer is governed by the external equipment. The completion of transfer of a block of data may, if desired, be signaled by an internal interrupt. In addition, there are 14 external interrupt lines which may be connected to peripheral equipment. The present assignment of channels and interrupts is given in the table in Appendix A.

*A simulated time mode described later also exists.

A priority hierachy governs the order in which requests for transfer or interrupt are honored. Higher numbered channels have priority over lower numbered ones. This is reflected in Appendix A where it is seen that magnetic tapes with the highest transfer rate is given top priority and the teletype and teleprinter with the lowest rate are given lowest priority. Except for magnetic tape the assignment is not really crucial.

The basic rate with which the computer is concerned is the 4 ms output rate to the azimuth and elevation servo systems. It was determined that a four-point interpolation formula with points computed accurately at two-second intervals would provide interpolated points at the 4 ms rate with sufficient precision. Two seconds is thus the basic system frame time, as it is called hereafter. That is, every two seconds a cycle[o] is started which does everything necessary to provide the 500 points needed for the following frame. The emptying of the azimuth output buffer and the consequent internal interrupt is the actual synchronizing signal.

III. SUBPROGRAM STRUCTURE AND CONVENTIONS

Each program in the pointing system is subject to a number of restrictions and conventions.

Programming must be done in the SPURT* language. An up-to-date symbolic card deck is maintained. The format of these cards is described in Reference 1. Compilation at the U-490 results in a printed listing. Furthermore, a magnetic tape for each program with a 321[†] and a 301[‡] output from the SPURT compilation is kept at the Haystack site.

Certain quantities must be passed between subprograms. These are kept in a section of memory called Common Storage[+]. Other quantities are also conveniently kept there. Thus, references to these quantities must use a standard name. At compilation time an Allocation Tape equates actual memory locations with these

*SPURT is the basic machine language compiler provided by Univac for the 490 computer.

†A 321 output is a relocatable binary program as stored on magnetic tape.

‡A 301 output is a magnetic tape image of the symbolic program in a format suitable for recompilation (or correction) by SPURT.

+See Appendix B for Common Storage detailed description.
oThis cycle is known as the Antenna Buffer Chain. See p. 15 for a full description.

names. A program is prohibited from using the name of any Common Storage register within his program for any use that conflicts with the Common Storage use.

Each program consists of an initialization section and an operation section. The first register of each program contains in the upper half (first fifteen bits) the entry address of the operation section, and in the lower half (last fifteen bits) the entry address of the initialization section. The initialization section starts with an ENTRY instruction and normally ends with an EXIT instruction. The operation section similarly starts and ends. For those programs with error returns, this return precedes the normal return in the calling sequence of the calling program.

Only the initialization section of a program may communicate with an operator via the teleprinter using Intercom.* (All sections may use the Printer Log program† for output on the high-speed printer.) Once an initialization section has been entered, it must exit (to the control program) or go to Intercom (even if only with a vacuous request) within 1.5 seconds. Upon return from Intercom, the same restriction must be met: either exit or go to Intercom within 1.5 seconds. The star, planet, sun, and moon programs as well as the coordinate conversion program all require references to tables stored on magnetic tape. Since they are held up waiting for magnetic tape interrupts, they are unable to meet the 1.5 second restriction. The control program, if asked to reinitialize the sun, moon, star, or planet programs (there is no provision for reinitializing coordinate conversion) turns off the output to the antenna so that no azimuth buffer interrupt occurs. When reinitialization is through, control restarts the antenna buffer output just as it does on initialization.

The second register of each program contains the five Fieldata characters which constitute the system name of the program. See Appendix C for the list of names. This name is used to identify the program on tape and in logging.

All subprograms may use the A, Q, or B registers freely with the exceptions of B1 and B2. If these two index registers are used, their initial contents must be saved upon entrance and restored upon exit.

Some programs may also have interrupt sections. These start with an ENTRY instruction, and usually end with an RILJPL (address of ENTRY). Therefore, interrupts (which are locked out by the computer automatically upon one being answered) are kept locked out until the last instruction of the interrupt answering routine has

*See Reference 6 for a detailed description.

†See Reference 8 for a detailed description.

been executed. There are rare exceptions.* The length of an interrupt routine is set at about one-tenth of the basic 4 ms antenna output rate in order to assure that a fresh supply of 500 points may be provided in time when needed. Thus, an interrupt routine may use only 400 μs or on the average, 40 instructions. Again, there are rare exceptions.* The interrupt program must restore all registers (A, Q, and B) which it uses to their entrance values before leaving.

IV. COMMUNICATION BETWEEN MAN AND COMPUTER

A. Console Keyboard-Printer

Standard equipment on the Univac 490 is a keyboard and teleprinter.† The characters include all the letters (upper case form), numerals, various symbols, and controls. The printer operates at a maximum rate of 10 characters per second. The keyboard and printer are not tied together. Rather, a key when struck is normally read by the computer which in turn prints the character corresponding to that key, though in some situations it may make a substitution.

It is this device which is used as the basic means of communication between man and the computer. A person types on the keyboard information which he wishes to enter into the computer. The computer prints this on the printer, and also takes the appropriate control action. The computer for its part may print information or requests for information on the printer. The man-machine interplay is what sets up the computer parameters for the experiment which the man wishes to conduct.

In the Haystack Pointing System, this communication is handled by a program called Intercom. It forms an integral link with the control program, described later. Intercom is capable of input (from the man) of alphanumeric characters, decimal or octal numbers, and controls and output (from any subprogram in the system) of statements or questions.

Briefly, the initialization section of a program in the system puts out a request for information which may be a YES or NO, a number of an option, a parameter

*The Antenna Buffer Interrupt Chain and the Right Ascension-Declination Display programs are exempted.

†See Figure 1 for photograph of keyboard.

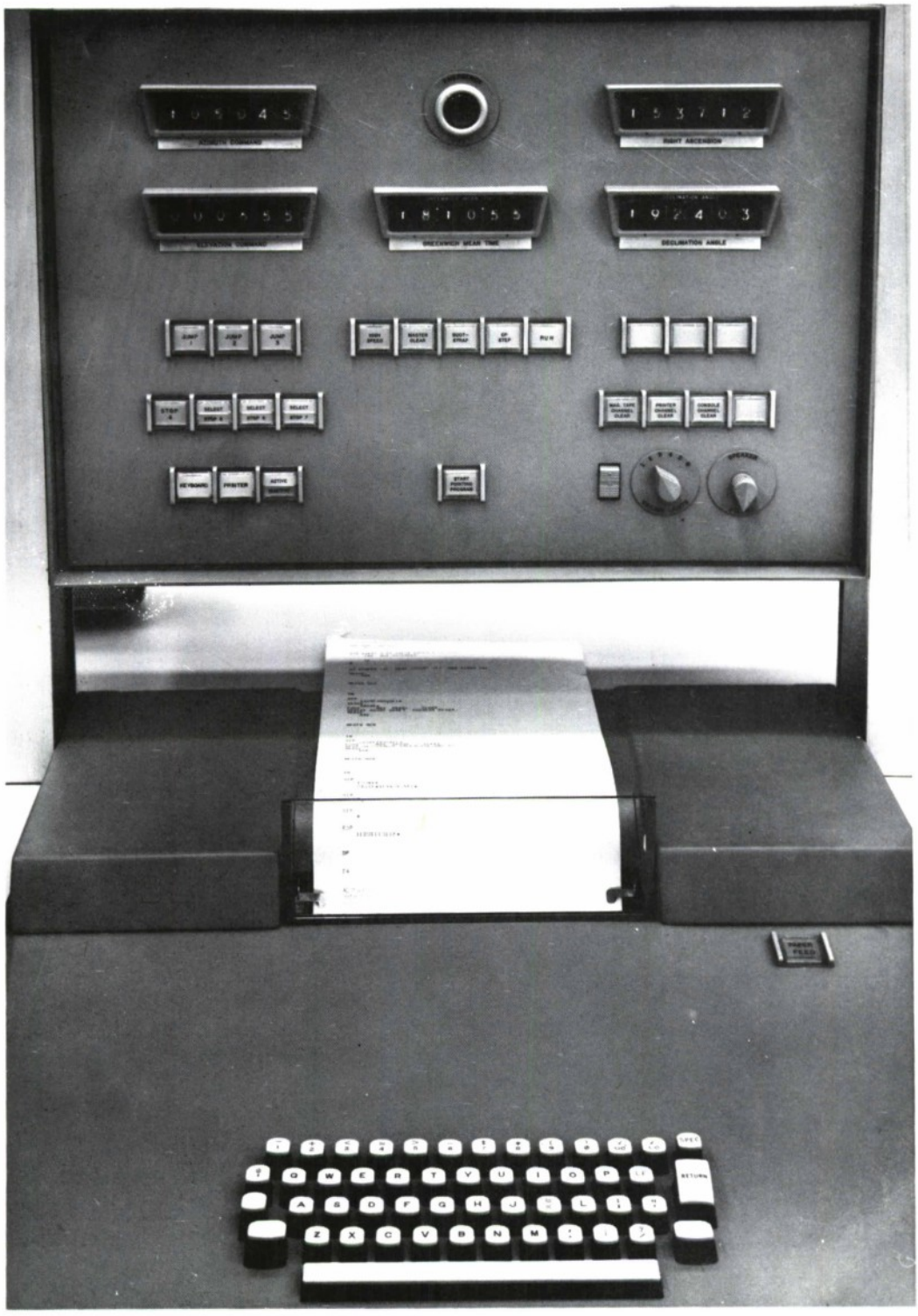

Fig. 1. Console keyboard-printer

(such as the semi-major axis of a satellite), or some titling information. The man then types in the information, terminating with a (carriage) return. This goes on until each program in the system has been initialized. The man may tell the machine that he wishes to change the setup by hitting an attention key (labeled (S) on the keyboard). The computer then determines from the man's responses to a series of questions what course of action to take.

Intercom also provides an error control, a means for the man to erase an answer, and a means to force in, in some cases, a number which normally would be rejected.

The questions and choices which the machine puts out are worded as unambiguously and succinctly as possible, to make it easy for an experimenter to set up his problem, with very little training in computer use. The questions put by the control program and by the timing program, the interpretation of responses, and information statements are given in Appendix E. The two main modes and two submodes of each are described in Appendix F. Questions put by other programs of the Pointing System are given in the memoranda describing these programs.

An experienced operator may answer a question before it is finished printing. Thus, if one knows that there are choices 1, 2, 3, and 4 to the current question and what these choices mean, he may type, at any time while the question is being printed, his answer followed by a carriage return. A carriage return alone will cause the standard answer for that question to be used. In either case, the printing of the answer is begun. A complete log of all questions in their entirety and the operator responses is printed on the high-speed printer. If the high-speed printer is off for one reason or another, this short-circuiting of questions is not permitted unless jump key 1 is on.

B. Buttons

There are other man-machine communication devices. One of these is a button labeled "START POINTING PROGRAM" which, when pressed, executes a series of actions culminating in the reading in the basic in-core programs from magnetic tape. This "bootstrap" procedure is described later and in Reference 1. There are also buttons labeled "JUMP 1," "JUMP 2," "JUMP 3" whose action is described in

sections on West Ford and Planning in Reference 8 and in a memorandum on the Print Program (Reference 9).

V. INTERCOM INTERLACE

Intercom has two entry points as do most other system programs. These entry points, however, do not exactly parallel the functions of those in other programs. The operation section of Intercom is the route that all system programs must follow in order to input and/or output information on the teleprinter. The initialization section of Intercom really serves a dual role. When MCP enters the initialization section, two very important control benchmarks are established. The first of these is the latest location, within MCP, to which Intercom will pass control while input and/or output via the teleprinter is in progress, but not completed. The second is the latest location, within MCP, to which control must be passed when it is next necessary to report the type-in of the attention symbol.

The attention symbol concept is at the very core of the design of the Master Pointing Program and as such is vital to the understanding of the system logic. When the attention key is struck in either upper or lower case, it is interpreted by the Pointing System to mean that the experimenter wants to communicate with the system as soon as possible. The way this is accomplished as well as the way Intercom Interlace in general works is illustrated in Fig. 2 and 3.

It should be noted in these diagrams that Intercom takes no immediate action when the attention key is struck, rather it exits to the MCP attention return point the next time it is entered in the initialization section by MCP.

Further, it should be noted that control does not return to a user program from Intercom until all input/output connected with its request is finished; rather control is returned to MCP at either the normal return point or the attention return point depending on whether or not the attention key has been struck. This means that the user program may be held up indefinitely (until an answer terminated by a carriage return occurs). This is the reason why only the initialization sections of programs may use Intercom. Should the working section be held up waiting for an answer, the system timing could not be maintained. Even if no answer is expected, the working section cannot use the teleprinter for, say, comments. Since only one program at a time may use Intercom, it is the responsibility of the control program

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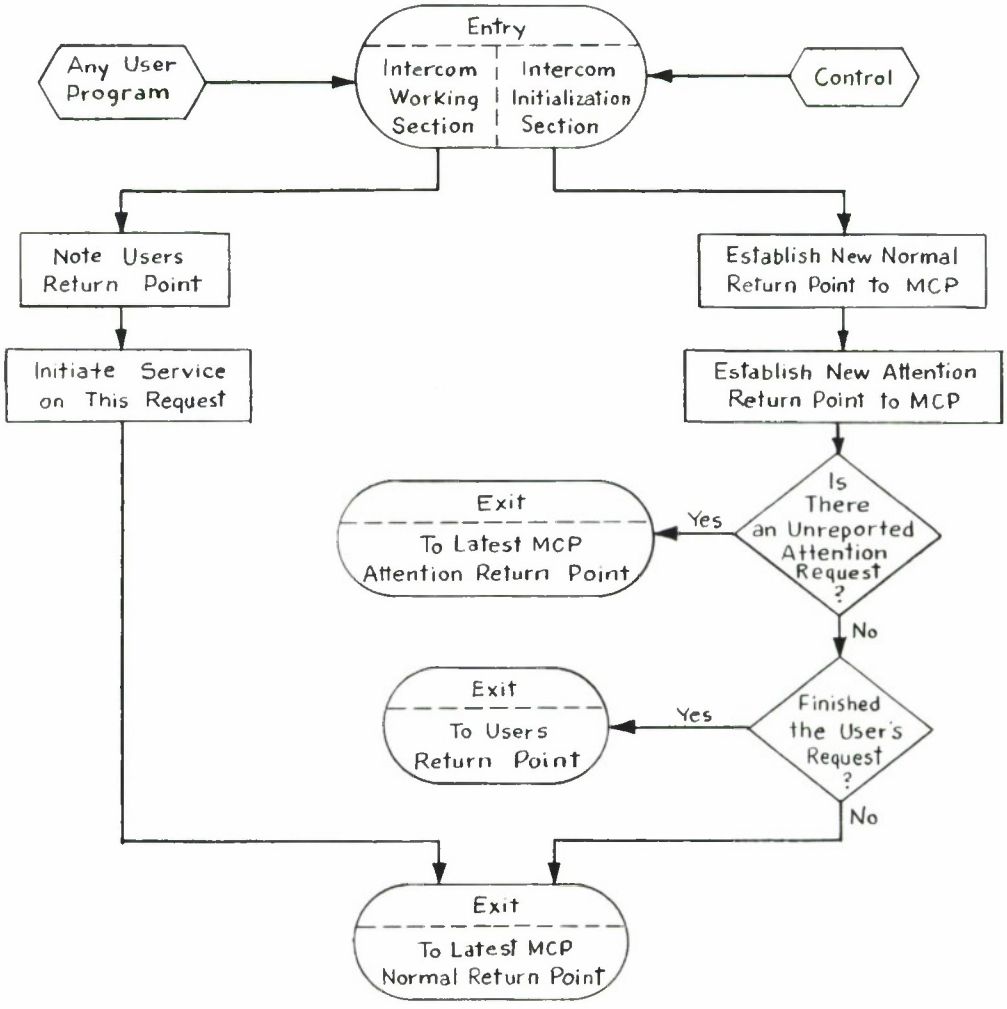

Fig. 2. MCP-intercom interlace

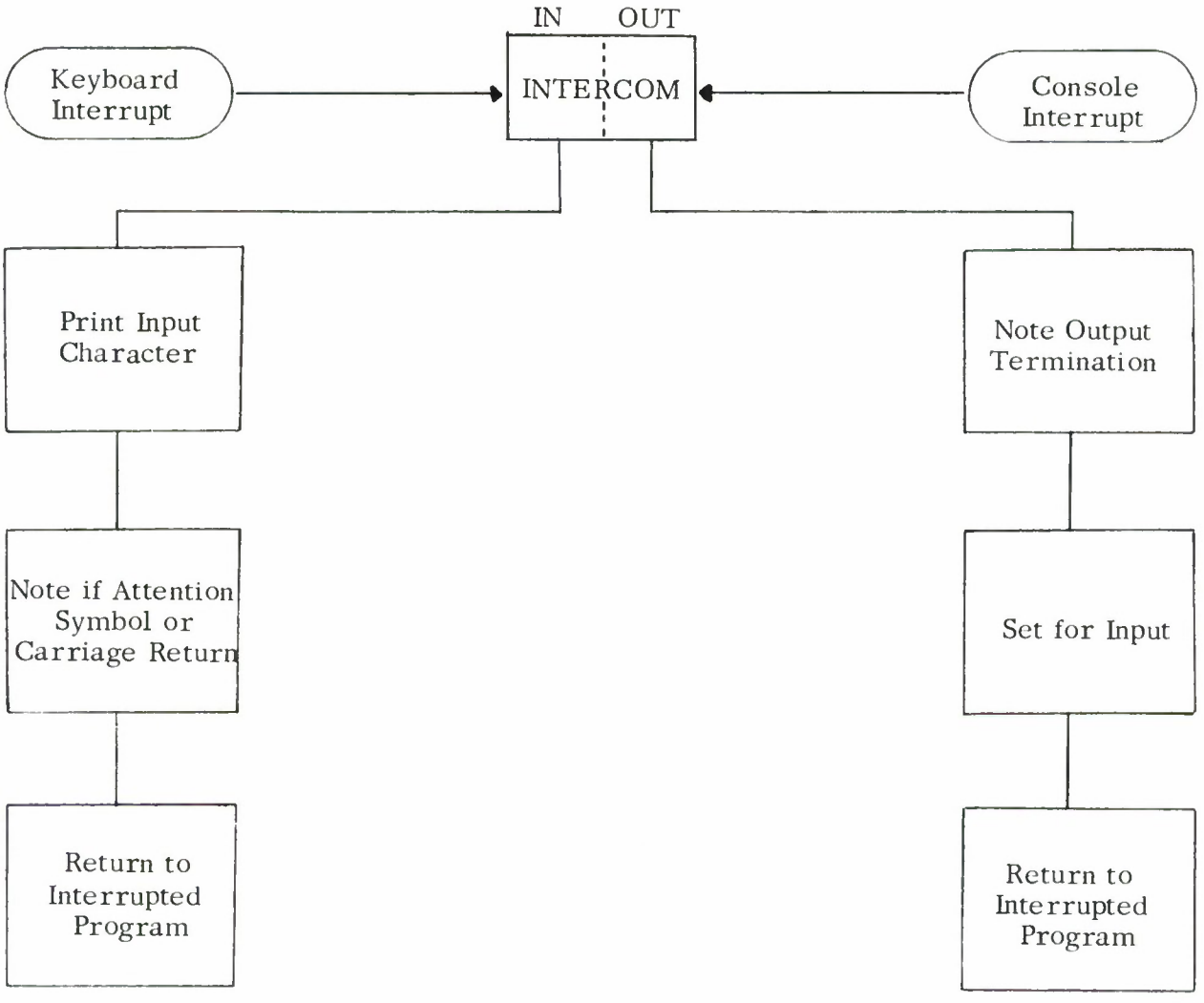

Fig. 3. Keyboard/console interrupt answering.

to sequence properly through the initialization sections, either during system initialization or during reinitialization.

The Intercom interlace normally lies outside of the antenna buffer chain in a waiting loop. If there is a data processing program in the system, it is also included in the waiting loop. If the data processing program takes longer than about 1.5 to 1.75 seconds it may be interrupted by the antenna buffer chain. At the completion of this interrupt, control is normally returned to the point of interrupt* in the data processing program. If this program is not yet finished by the time of the next azimuth buffer interrupt, there will have been no Intercom interlace executed this frame. The question and answer session will have come to a stop; even attention requests will not have been honored. Indeed, if the data processing program takes an infinite length of time, man-machine communications would cease entirely. Therefore, the Intercom interlace moves within the antenna buffer chain if the interrupted program is a data processing program. The maintenance of communications is assured, with the longest response time set at about two seconds. (With no data processing program in the system, the longest response time is about one quarter-second.)

The fact that the Intercom interlace may be within the antenna buffer chain explains the restriction on returns to Intercom (or to the control program by EXIT) by a user program every 1.5 seconds. Since it would be fatal for any program to interrupt itself, this restriction assures that the antenna buffer chain exits before it is entered again at the next two-second mark.

VI. CONTROL

A. General

The sequence of operating programs in the Haystack system is determined by the Master Control Program (MCP) and by the interrupt capability of the computer.

*A data processing program may be written to take all the remaining time in a frame, by setting the appropriate common storage switch, it can request that control be returned to the beginning of the waiting loop, including the Intercom interlace, and to the beginning of the data processing program, rather than to the point at which it was interrupted.

When the Pointing program is first read in, control initializes several subprograms of the system, begins output to the antenna, and then goes into a waiting loop. The different program actions which take place occur as the result of various interrupts, the basic one being a request every two seconds (in normal operation) for 500 more pointing data to the antenna. These actions are described in detail in the following sections.

B. Control Set-Up

When the "START POINTING PROGRAM" button is pushed, a wired-in program is started which reads into core a magnetic tape record in the "bootstrap" format. In the Pointing system, this record contains those programs which are in-core all the time regardless of the particular experiment being carried out. If the tape is read without a detected error, control is transferred to the MCP. See Reference 1, for format and method of making a system tape.

MCP now begins its initialization procedure. It sets values into some of the Common Storage registers.* It disables interrupts. It sets up entry points to the several subprograms. It establishes the Intercom interlace described previously.

Through a series of questions and answers with the experimenter, the experiment parameters are entered into the system. This includes the reading in of the requested Celestial Point Computation program and a Data Processing program, if any, and their question-answer exchange. Other subprograms are also initialized at this time.

MCP now goes through the business of obtaining the first bufferful of data by entering a subset of programs of the antenna buffer chain (described later) four times with the correct times so that a set of interpolated pointing data valid for the experiment start time is ready.

MCP then bides its time until the clock reaches the experiment start time, when it enters the antenna buffer chain, beginning the first output of points to the antenna, and incidentally establishing a waiting loop.

From this point on, the various program actions are initiated by the different interrupts which occur.

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*See Appendix D for detailed description.

C. Site Control

The Pointing system can be controlled from the Haystack site or the Westford site. If JUMP KEY 3 is on, Intercom is told to accept input from Westford; otherwise, Haystack is in charge. In either case, pointing data goes out to both sites where it is accepted or rejected. *

D. Interrupt Entrance Registers

First, MCP sets all interrupt entrance registers to "Release Interrupt Lockout (RIL)" instruction. Next, those subprograms which have interrupt answering sections set the appropriate interrupt entrance register. MCP also sets the interrupt entrance register for the azimuth output channel to enter the antenna buffer chain.

E. Entry Sort

The SYSLOADER program† sets up a table of subprogram names and entrance registers during the process of preparing a magnetic tape copy of the Pointing System. MCP in effect sorts this table to provide for itself and other programs in the system a block of initialization and operation entries for every program.

F. Common Storage Registers

MCP sets up a number of Common Storage registers, on first being bootstrapped in, to their accepted values, namely, those dealing with the figure of the earth, site characteristics, astronomical constants, system status, and a few miscellaneous ones. These are given in Appendix G.

G. Experiment Parameter Set-Up

1. Initialization

Left over scans are cleared. Dynamic Dump is turned off. Outputs are terminated on azimuth, elevation, and magnetic tape channels. The Ephemeris tape‡ is rewound. MCP asks for the Title to be used in identifying recorded data for this experiment.

*See References 5 and 7.

†See Reference 1.

‡See Reference 21.

2. Timing

Timing, while an integral part of control, is, for convenience, a separate subprogram. Upon being initialized for the first time, this program asks for the month and day; at subsequent initializations, this information is requested only when in simulated mode. The 100 μsec clock is read and printed and used to set up the system time registers.

The type of run, real time or simulated, is asked of the experimenter. For real-time runs, one has the option of beginning at a stated time or "as soon as possible". For simulated runs, one may elect a stationary time or a fictitious start time. In the latter case, one may also vary the time between computed points (frame size, normally set at 2 seconds), the system cycle time (slow speed = 2 seconds, or high speed $\approx$ 1/4 second), and the duration of the run, in days.

H. Celestial Point Computation

The experimenter is given his choice of 8 basic celestial programs: (1) belt, (2) satellite, (3) fixed azimuth-elevation, (4) sun, (5) star, (6) planet, (7) moon, and (8) fixed right ascension-declination. If the chosen program is not in core memory it is read in from magnetic tape. If successful in blocking in the program, MCP initializes the coordinate conversion program, the right ascension-declination display program, the Westford intersite coupling program, and then the celestial point computation program. The recording, acquisition, and interpolation programs are also initialized now.

I. Starting the System

Given azimuth, elevation, doppler, and range at t_2 and having saved these quantities for t_{-1}, t_o, and t_1, where t_{-1}, t_o, t_1, and t_2 are successive times one frame size (normally 2 seconds) apart, the Interpolation program, using a four-point formula interpolates the 500 azimuth, elevation, and doppler values, and the one range value valid in the interval (t_o, t_1).

Thus, if the first output is to occur at t_o, the interpolation must have occurred earlier. Therefore, MCP, knowing that the system will start at t_o, goes through the point computation chain* four times with time set successively to t_{-1},

*This consists of most of the programs in the antenna buffer chain described in the next section.

t_o, t_1, and t_2.

MCP now monitors the clock. When it reaches t_o, the azimuth buffer chain is entered (with computation time set at t_3) where the output for the frame (t_o, t_1) is initiated and the output for the next frame (t_1, t_2) is computed.

The above describes real-time operation. In simulated time, the clock is not monitored. The planning program is initialized when in simulated mode.

At this point, the system is cycling. In real time, and slow speed simulated time, the two-second interrupt which occurs when the azimuth buffer empties causes the antenna buffer chain to be entered, providing the next buffer of points. In high-speed simulated time, the antenna buffer chain is entered when both recording and Intercom output channels are not busy.

J. The Antenna Buffer Chain

Each two seconds when an azimuth buffer is emptied, an internal interrupt causes the antenna buffer chain to start its main function of providing a new set of 500-word buffers of azimuth and of elevation, 500 values of doppler, and 1 value of range. The complete sequence of programs takes about one quarter second. Following are short descriptions of each program in this chain.

1. Control

MCP orders programs in the chain. It also alternates buffers, starts output of the command azimuths and elevations, and input of the actual (encoder) azimuths and elevations. It reads the clock at appropriate points in the chain.

2. Timing

The Timing program provides times for each program in the chain that needs it. Normally, these times will all be the same and be three frame sizes later than the start of the current frame (in real-time operation, this will be 6 seconds later). These times may be modified, however, to take account of transit time, effective changes in perigee passage time for satellites, etc. A check is made in real-time operation every two seconds to verify that the external 100 μs clock and an internal program clock are synchronized to within 3.8 ms. The experiment is aborted in the event that this limit is exceeded.

3. Celestial Coordinate Computation

Any one of eight celestial coordinate computation programs may operate now as determined by the operation during the initialization of the system; they are: (1) belt, (2) satellite, (3) fixed azimuth-elevation, (4) sun, (5) star, (6) planet, (7) moon, and (8) fixed right ascension-declination. See References 8, 10, 11, 12, 13, 14, and 15.

Except for fixed azimuth and elevation, these programs compute the radius (ρ), the right ascension (α), and declination (δ), of the observed point as well as the derivatives, $\dot{\rho}$, $\dot{\alpha}$, $\dot{\delta}$. In the case of the fixed azimuth and elevation program, an azimuth and elevation are provided instead, and the coordinate conversion program is turned off. The belt and the satellite programs provide also the orientation of the orbit with the meridian plane through the observed point.

4. Celestial Scan

The celestial scan program can scan in right ascension or declination, in both simultaneously, or in a box oriented in right ascension or declination. It can also provide offsets in right ascension or declination. See Reference 19.

5. Coordinate Conversion

The coordinate conversion program takes ρ, and α and δ (as modified by celestial scan) and computes the corresponding radar coordinates, range (R), azimuth (A), and elevation (E). Using, in addition $\dot{\rho}$, $\dot{\alpha}$, and $\dot{\delta}$ it computes the range rate, $\dot{R}$. It also converts the orbit orientation angle computed by belt or satellite program to an angle between the orbit and the azimuth plane through the observed point. See Reference 4.

6. Radar Scan

The radar scan program can scan in azimuth or elevation, in both simultaneously, or in a box oriented in azimuth or in elevation. It can also scan (for a short distance) along the orbit of a satellite or belt, or across the orbit. It may scan in a box oriented along the orbit. It may provide offsets in azimuth or in elevation. See Reference 19.

7. Correction

To account for atmospheric refraction and for departures from the ideal of the antenna, a correction program adds in the appropriate bias to azimuth and elevation so that the actual beam may be directed at the desired point. See Reference 18.

8. Acquisition

When activated, a satellite acquisition program which works closely with the interpolation program, initiates a search procedure around the nominal satellite position and looks for received energy. An autotrack then may take over, or the program may keep track of the satellite. See Reference 16.

9. Interpolation

Having kept the last three points in radar coordinates and having just obtained a new point, the interpolation program is set to fill up the 500 point azimuth, elevation, and doppler buffers which will be valid for the next frame. In this process, compensation is made for the servo system. Range is computed for the middle of the frame. Doppler is computed from range rate. See Reference 3.

10. Intercom

Intercom may occur in the antenna buffer chain when there is a data processing program in the system. It normally appears, however, in the waiting loop. See Reference 6.

11. Dynamic Dump

Dynamic dump is a utility program which may operate after each of the preceding programs and gives contents of selected registers on the on-line high-speed printer. See Reference 8.

12. West Ford

The West Ford program prepares buffer values of range, azimuth, elevation, and doppler for the West Ford antenna and the Millstone antenna. To do this, it uses data prepared for the Haystack antenna. See Reference 8.

13. Planning

The planning program logs rise and set times for the observed body on the high-speed printer. See Reference 8.

VII. ATTENTION PROCESSING

An important feature of the Haystack Pointing program is the capability of man-machine communication while the program continues to put out points to the antenna. It is possible to vary many of the parameters of the experiment without stopping the antenna.

Upon hitting the Attention key, control is transferred to the Attention Processing section of MCP. Through a ranked series of questions, the initialization section of the desired program is entered.

If this program is one which can be reinitialized in real time (all programs except for a few celestial programs) the antenna buffer chain continues to operate. The reinitializing program asks the experimenter about changes to be made. These occur concurrently with the operation section using the changing values. When finished, the initialization section usually exits to the MCP. A few programs, Timing, Scan, Fixed Azimuth-Elevation, and Fixed Right Ascension-Declination stay in the initialization section, to permit rapid changes to be made. (Hitting the Attention key allows another program to be called for reinitialization.)

If the program cannot be reinitialized in real time, output to the antenna stops. Upon completion of the reinitialization, MCP goes once more through the business of providing a valid set of points for the output buffers before starting the system to recycle.

The timing program upon reinitialization allows changes in the stationary time.

VIII. AUTOMATIC REINITIALIZATION

The Pointing program can run a maximum of two days in real time. At the end of that time output is terminated and the experimenter must set up his run again. (It should be noted that for the initiated a mere carriage return answer to most of the questions confirms the previous answer.)

In simulated time, the situation is different. The Timing program, when it discovers that the two day limit has been reached terminates output, and updates the registers containing day of the month and day of the year. After the recording program has finished recording the data for the present frame, the timing program reinitializes coordinate conversion and the celestial point computation program (which now ask no questions via Intercom) and then reactivates the buffers, and continues with the remainder of the azimuth buffer chain.

A block diagram of the control program structure appears in appendix G. Listings of the Master Control Program (MCP) and Timing Program (TIMING) are found in appendix H.

APPENDIX A
I-O Channel Assignment

Equipment	Input Channel Number	Output Channel Number	Interrupt Number	Transfer Rate
West Ford Teletype	0	0		10 characters per sec.
Console Keyboard, Teleprinter	2	2		10 characters per sec.
High Speed Printer	3	3		10 lines per sec.
Paper Tape Reader	4			400 lines per sec.
Paper Tape Punch		4		110 lines per sec.
General Purpose	5	5		variable
Clock	7			100 μs
Clock			7	1 sec.
Range		8		radar p. r. f.
Range	8			variable, order of magnetitude of p. r. f.
Doppler		9		radar p. r. f.
Doppler	9			variable, order of magnitude of p. r. f.
Elevation	10	10		4 ms
Azimuth	11	11		4 ms
West Ford		12		20 datum points of 3 words each per second
West Ford			12	Manual
Millstone		12		20 datum points of 4 words each per second
Millstone	12			30 datum points of 6 words each per second
Magnetic Tapes	13	13		80 μs
Magnetic Tapes			13	variable

APPENDIX B
Common Storage Contents

The following table lists in alphabetical order each common storage register, its current absolute core location, the definition, the normal value (if any) the units and scaling, the programs which set the register, and the programs which use them.

The following abbreviations are used:

Abbreviation	Meaning
A. U.	Astronomical Unit
AZ	Azimuth
BCD	Binary coded decimal
CPS	Cycles per second
CYC	Cycles
DEC	Declination
DEG	Degrees
DPP	Data processing program
E.E. R.	Earth's equatorial radius
EL	Elevation
E.P. R.	Earth's polar radius
E.R.	Earth's equatorial radius
FD	Fieldata
FWA	First word address
G.M. T.	Greenwich mean time
h	Hour
L	Lower half of word
LWA	Last word address
m	Minutes
Mc/s	Megacycles/second
N. M.	Nautical mile
R.A.	Right ascension
RAD	Radians
REV	Revolutions

Abbreviation	Meaning
s	Seconds
SEC	Seconds
U	Upper half of word
μsec	Microsecond
$\subseteq$	Contains
$\not\subseteq$	Does not contain
$\rightarrow$	Denotes or implies

The program abbreviations are given in Appendix C.

LABEL	LOCATION	DEFINITION	NORMAL VALUE	UNITS	SCALE	SET BY	USED BY
ACQAZIM	63Ø71	Azimuth Angle After Acquisition	-	REV	B27	ACQUI	INTER
ACQELEV	63Ø75	Elevation Angle after Acquisition	-	REV	B27	ACQUI	INTER
ACQUI	63427	U-Tag of Acquisition Program	-	-	-	MCPGM	MCPGM
ACTUALTIME	63142	Full Thirty Bit Real Time Clock Reading	-	100 μsec	BØ	MCPGM TIMEP	
ADSCN	63416	U-Tag of Celestial Scan Program	-	-	-	MCPGM	MCPGM
AEBOXLINES	63507	Az-El - Box Scan Parallel Indicator $\neq$ Ø → Lines parallel Elevation = Ø → Lines parallel Azimuth	Ø	-	-	SCAN PDMTR	SCAN
AESCN	63417	U-Tag of Azimuth Elevation Scan Program	-	-	-	MCPGM	MCPGM ADSCN
ALNGACRSCN	635Ø6	Along or Across Scan Indicator $\neq$ Ø → Along or across scan = Ø → No along or across scan	Ø	-	-	SCAN	SCAN
ALNGOFFSET	63517	Along Orbit Offset	Ø	REV	B27	SCAN PDMTR	SCAN
ARCOFAZIM	63524	Arc of Azimuth Scan	Ø	REV	B27	SCAN	SCAN
ARCOFDEC	63526	Arc of Declination Scan	Ø	REV	B27	SCAN PDMTR	SCAN
ARCOFELEV	63522	Arc of Elevation Scan	Ø	REV	B27	SCAN	SCAN

LABEL	LOCATION	DEFINITION	NORMAL VALUE	UNITS	SCALE	SET BY	USED BY
ARCOFRA	63530	Arc of Right Ascention Scan	Ø	REV	B27	SCAN PDMTR	SCAN
ASTRODEC	631Ø6	Declination Output of RADEC	-	Degrees, Minutes & Seconds (BCD)	-	RADEC	RDMTR
ASTRORA	63105	Right Ascension Output of RADEC	-	Hour, Minute & Second (BCD)	-	RADEC	RDMTR
AUPEREQUAT	63341	(E. E. R. /A. U.) x (10^4)	4263561	-	B28	MCPGM	
AZELEXSCAN	635ØØ	AZ-EL Box Scan Indicator ≠ Ø → AZ-EL Box Scan = Ø → No Az-EL Box Scan	Ø	-	-	SCAN PDMTR	SCAN
AZELOTIME	63532	Time at which Latest AZ or EL Scan was Initiated	Ø	SEC	BØ	SCAN	SCAN
AZIM	63053	True Azimuth	-	REV	B27	COCON FXANE	AESCN RADEC
AZIMADD	63442	Contains Locations of the Two Azimuth Output Buffers	-	-	-	MCPGM	MCPGM INTER RADEC
AZIMIN	75ØØØ	Azimuth Input Buffers for Current Frame	-	REV	B19		
AZIMOFFSET	63512	Azimuth Offset	Ø	REV	B27	SCAN PDMTR	SCAN
AZIMOUT	64ØØØ	Current Azimuth Output Buffer	-	REV	B19	INTER	

LABEL	LOCATION	DEFINITION	NORMAL VALUE	UNITS	SCALE	SET BY	USED BY
AZIMOVER	63325	– Ø = Start In Azimuth Overlap + Ø = Start Out of Azimuth Overlap	Ø	-	-	MCPGM CHPAR	INTER
AZMTHSCAN	635Ø1	Azimuth Scan Indicator ≠ Ø → Azimuth Scan = + Ø No Azimuth Scan	Ø	-	-	SCAN PDMTR	SCAN
BLASTOFF	63146	G. M. T. of First Output Data	-	200 μsec	BØ	MCPGM	BELTP SATEL
BODYSIZE	63462	Three Words Containing Fieldata Identification of a Celestial Object	-	-	-	PLNET STARP	PRINT
CAZIM	63Ø6Ø	Corrected Azimuth	-	REV	B27	CORCT	ACQUI RADEC
CELBODY	63113	First of Three Locations Filled by STAR or PLANET Program with Fieldata Name of Celestial Orbit	-	-	-	STARP PLNET	PRINT
CELCOMPGM	63424	U-Tag of in-core Celestial Program	-	-	-	MCPGM	MCPGM
CELEV	63Ø61	Corrected Elevation	-	REV	B27	CORCT	ACQUI RADEC
CELTIME	63133	Time for which Celestial Computation Program Computes a New Point	-	DAYS	B28	MCPGM TIMEP	CELPGM
CHCOR	63422	U-Tag of Change-Core Program	-	-	-	MCPGM	MCPGM

LABEL	LOCATION	DEFINITION	NORMAL VALUE	UNITS	SCALE	SET BY	USED BY
CHPAR	63431	U-Tag of Change Parameters Program	-	-	-	MCPGM	MCPGM
COCON	63414	U-Tag of Coordinate Conversion Program	-	-	-	MCPGM FXANE COCON	MCPGM
CONVERTIME	63135	CELTIME for Coordinate Conversion Program	-	DAYS	B28	MCPGM TIMEP	COCON
CORCT	6342Ø	U-Tag of Correction Program	-	-	-	MCPGM	MCPGM
COSAZEL	63Ø7Ø	Cosine of Angle Between Orbit Plane and the Azimuth Plane	-	-	B29	COCON	AESCN
COSORIENT	63Ø65	Cosine of Angle Between Orbit Plane and the Meridian	-	-	B29	MCPGM BELTP SATEL	COCON
CRANGE	63Ø57	Corrected Range	-	RADAR UNITS	-	CORCT	INTER
CRSSOFFSET	63516	Across Orbit Offset	Ø	REV	B27	SCAN PDMTR	SCAN
DATANALYZE	63425	U-Tag of In-Core Data Processing Program	-	-	-	MCPGM	MCPGM
DAY	6315Ø	U ≦ DAY L ≦ DAY Number	-	DAYS DAYS	U:B15 L:BØ	TIMEP	CELPGM COCON RDMTR
DEC	63ØØ3	Apparent Declination	-	REV	B27	CELPGM	ADSCN RADEC
DECDOT	63Ø1Ø	Numerical Derivative of Declination	-	RAD/SEC	B37	CELPGM	COCON

LABEL	LOCATION	DEFINITION	NORMAL VALUE	UNITS	SCALE	SET BY	USED BY
DECLINSCAN	635Ø5	Declination Scan Indicator ≠ Ø → Declination Scan = + Ø → No Declination Scan	Ø	-	-	SCAN PDMTR	SCAN
DECOFFSET	63515	Declination Offset	Ø	REV	B27	SCAN PDMTR	SCAN
DELTATEE	63316	Ephemeris Time Minus Universal Time	35 sec	DAYS	B28	MCPGM CHPAR	CELPGM
DOPPADD	63444	Contains Locations of the Two Doppler Output Buffers	-	-	-	MCPGM	MCPGM INTER
DOPPOUT	66ØØØ	Current Doppler Output Buffer	-	CPS	BØ	INTER	
DSECONDS	63141	Seconds; Ø ≤ S < 172ØØ	-	SECS	BØ	MCPGM TIMEP	TIMEP
DUMSECTTG	63154	Start Time for Simulation Runs	-	SECS	BØ	TIMEP	MCPGM
DYDMP	63421	U-Tag of Dynamic Dump Program	-	-	-	MCPGM	MCPGM
ELEV	63054	True Elevation	-	REV	B27	COCON FXANE	AESCN RADEC
ELEVADD	63443	Contains Locations of the Two Elevation Output Buffers	-	-	-	MCPGM	MCPGM INTER RADEC
ELEVIN	76ØØØ	Elevation Input Buffer for Current Frame	-	REV	B19		
ELEVOFFSET	63513	Elevation Offset	Ø	REV	B27	SCAN PDMTR	SCAN

LABEL	LOCATION	DEFINITION	NORMAL VALUE	UNITS	SCALE	SET BY	USED BY
ELEVOUT	65ØØØ	Current Elevation Output Buffer	-	REV	B19	INTER	
ELVTNSCAN	635Ø2	Elevation Scan Indicator $\omega \neq Ø \rightarrow$ Elevation Scan $\omega = +Ø \rightarrow$ No Elevation Scan	Ø	-	-	SCAN PDMTR	SCAN
EQUATOR	63323	Earth's Equatorial Radius (E.E.R)	3443.9525	N.M.	B17	MCPGM CHPAR	CELPGM COCON
ESTSHIFTED	63143	Eastern Standard Time	-	200 μsec	BØ	MCPGM TIMEP	
EXPNAME	63350	Title of Experiment (Sixteen Words)	-	-	-	MCPGM	RECRD RDMTR
FIRSTELEV	631Ø4	First Elevation Output to Antenna	-	REV	B27	PLANP	PLANP
FIRSTHRU	63153	Bootstrap Indicator $+Ø$ = Just Bootstrapped $-Ø$ = Not just Bootstrapped	-	-	-	MCPGM	MCPGM RADEC
FLATTENING	63337	(E.E.R. -E.P.R.)/E.E.R.	1/297	-	B28	MCPGM	
FRAMESIZE	631Ø1	Duration of Frame	-	SEC	BØ	TIMEP	MCPGM TIMEP SATEL RADEC
FREQUENCY	63317	Haystack Transmitter Frequency	7750	Mc/s	B14	MCPGM CHPAR	WFORD INTER
GEOCENLAT	63322	Site Geocentric Latitude	-	Degrees	B20	COCON	COCON

LABEL	LOCATION	DEFINITION	NORMAL VALUE	UNITS	SCALE	SET BY	USED BY
GEODETLAT	63321	Site Geodetic Latitude	42.618	Degrees	B2Ø	MCPGM CHPAR	COCON RADED
GMTMODU24	63145	Greenwich Mean Time Ø h ≤ GMT < 24h	-	200 μsec	BØ	MCPGM TIMEP	MCPGM TIMEP
GMTSHIFTED	63144	Greenwich Mean Time	-	200 μsec	BØ	MCPGM TIMEP	
HEIGHT	63326	Site's Height Above Sea Level	475.	Feet	BØ	CHPAR MCPGM	INTER
HOLDNOHOLD	63511	Hold Indicator	Ø	-	-	SCAN PDMTR	SCAN
HOURMINUTE	63137	U ≙ Hours Ø ≤ h < 48 L ≙ Minutes Ø ≤ m < 6Ø	-	U: Hours L: Minutes	U:B15 L:BØ	MCPGM TIMEP	
HOURREG	63151	Greenwich Hour to Start	-	Hours	BØ	TIMEP	MCPGM
IDICELCOR	63ØØØ	Identification of Data Record	MCPGM	FD Characters	-	MCPGM	PRINT
INAZIMADD	63446	Contains Locations of the Two Azimuth Input Buffers	-	-	-	MCPGM	MCPGM RADEC
INELEVADD	63447	Contains Locations of the Two Elevation Input Buffers	-	-	-	MCPGM	MCPGM RADEC
INTER	63413	U-Tag of Interpolation Program	-	-	-	MCPGM	MCPGM
INTERAZIM	72ØØØ or 64ØØØ	Interpolated Azimuths for Next Frame	-	REV	B19	INTER	WFORD

LABEL	LOCATION	DEFINITION	NORMAL VALUE	UNITS	SCALE	SET BY	USED BY
INTERCOM	63426	U-Tag of Console Keyboard and Teleprinter/Teletype Communication Program	-	-	-	MCPGM	MCPGM
INTERDOPP	74ØØØ or 66ØØØ	Interpolated Dopplers for Next Frame	-	Cyc/sec	BØ	INTER	WFORD
INTERELEV	73ØØØ or 65ØØØ	Interpolated Elevations for Next Frame	-	REV	B19	INTER	WFORD
INTERLCKSW	6346Ø	Magnetic Tape Interlock Indicator U ≅ + Ø = No Interlock U ≅ – Ø = Interlock	-	-	-	RECRD	RDMTR PDMTR
INTERRANGE	76777 or 7Ø777	Range Output for Next Frame	-	Radar Units	BØ	INTER	WFORD
KMPERNM	63342	Kilometers per Nautical Mile	1.852	-	B28	MCPGM	
KYBRDLEVEL	6311Ø	Type Out Indicator to Celestial Programs + Ø = Use Typewriter – Ø = Do not use Typewriter	-	-	-	TIMEP	CELPGM
LONGITUDE	6332Ø	Site Longitude	288.5113	Degrees	B2Ø	MCPGM CHPAR	COCON BELTP
LSPERAU	63336	Light Seconds per Astronomical Unit	499.ØØ5	-	B2Ø	MCPGM	
MAINSWITCH	63334	System Buffer Alternator Low order bits equals Ø = Buffer Ø Low order bit equals 1 = Buffer 1	-	-	-	MCPGM	MCPGM TIMEP

LABEL	LOCATION	DEFINITION	NORMAL VALUE	UNITS	SCALE	SET BY	USED BY
MCPFILLER	71ØØØ	Identification of a Data Record	MCPGM	FD Characters	-	MCPGM	PRINT
MCPGM	63412	U-Tag of Master Control Program	-	-	-	SYS-LOADER	TIMEP CHPAR
MILLSTNADD	63451	Contains Locations of the Two Millstone Output Buffers	-	-	-	MCPGM	MCPGM WFORD
MINREG	63152	Greenwich Minute to Start	-	Minutes	BØ	TIMEP	MCPGM
MSFREQ	63332	Millstone Transmitter Frequency	1295.	Mc/s	B14	MCPGM CHPAR	WFORD
NMPERAU	6334Ø	Length of Astronomical Unit	80776434	N. M.	BØ	MCPGM	
PERIODAZIM	63523	Period of Azimuth Scan	Ø	SEC	BØ	SCAN	SCAN
PERIODDEC	63525	Period of Declination Scan	Ø	SEC	BØ	SCAN PDMTR	SCAN
PERIODELEV	63521	Period of Elevation Scan	Ø	SECS	BØ	SCAN	SCAN
PERIODRA	63527	Period of Right Ascension Scan	Ø	SECS	BØ	SCAN PDMTR	SCAN
PLANP	63434	U-Tag of Planning Program	-	-	-	MCPGM	MCPGM
PLOTP	63436	U-Tag of Plot Program	-	-	-	MCPGM	MCPGM
POLE	63324	Earth's Polar Radius (E. P. R.)	3432. 3567	N. M.	B17	MCPGM CHPAR	CELPGM COCON
PREVIOUSTM	63461	G. M. T. Time of the Previous Time Check	-	200 μsec	BØ	TIMEP	TIMEP

LABEL	LOCATION	DEFINITION	NORMAL VALUE	UNITS	SCALE	SET BY	USED BY
PRLOG	63423	U-Tag of Printer Log Program	-	-	-	MCPGM	MCPGM
RA	63ØØ2	Apparent Right Ascension	-	REV	B27	CELPGM	ADSCN RADEC
RADARMODE	63312	U $\overset{\subseteq}{\equiv}$ +Ø → Receiving U $\overset{\subseteq}{\equiv}$ −Ø → Transmitting	-	-	-		TIMEP
		L $\overset{\subseteq}{\equiv}$ +Ø → Radar Mode L $\overset{\subseteq}{\equiv}$ −Ø → Passive Mode				MCPGM	INTER
RADCBXSCAN	635Ø3	Right Ascension-Declination Box Scan Indicator ≠Ø → R.A. Dec. Box Scan =+Ø → No R.A. DEC Box Scan	Ø	-	-	SCAN PDMTR	SCAN
RADECOTIME	63531	Time at which Latest RA or DEC Scan was Initiated	Ø	SEC	BØ	SCAN PDMTR	SCAN
RADINDIC	63157	Indicator Set When RADEC is to be Used as a Subroutine by the RADIOMETER Program −Ø = RADEC subroutine for RDMTR +Ø = Normal	+Ø	-	-	RDMTR	RADEC
RADIODEC	63541	Declination for Radiometer	-	REV	B27	RADEC	RDMTR
RADIOMETER	631Ø2	Printer Priority for Radiometer	-	Ø or ≠Ø	-	MCPGM RDMTR	PRLOG
RADIORA	6354Ø	Right Ascension for Radiometer	-	REV	B27	RADEC	RDMTR
RADIUS	63ØØ6	Distance from Geocenter to Object + → E.R.	-	E.R.	B22	CELPGM	COCON
		− → A.U. Ø → ∞	-	A.U.	B24		RADEC

LABEL	LOCATION	DEFINITION	NORMAL VALUE	UNITS	SCALE	SET BY	USED BY
RADIUSDOT	63Ø11	Numerical Derivative of Radius Vector	-	N. M. /SEC	B24	CELPGM	COCON
RADOT	63ØØ7	Numerical Derivative of Right Ascension	-	RAD/SEC	B37	CELPGM	COCON
RANGE	63Ø52	True Range (Ø Range Denotes ∞)	-	Radar Units	BØ	COCON	CORCT RADEC
RANGEADD	63445	Contains Location of the Two Range Output Buffers	-	-	-	MCPGM	MCPGM INTER
RANGEDOT	63Ø62	Time Derivative of Range	-	N. M. /SEC	B24	COCON	INTER
RANGEOUT	7Ø777	Range Output for Present Frame	-	Radar Units	BØ	INTER	
RAOFFSET	63514	Right Ascension Offset	Ø	REV	B27	SCAN PDMTR	SCAN
RASCNSCAN	635Ø4	Right Ascension Scan Indicator $\omega \neq Ø \rightarrow$ RA-DEC Scan $\omega = +Ø \rightarrow$ No RA decl. Scan	-	-	-		
RDEOXLINES	6351Ø						
RDMTR	6343Ø	U-Tag of Radiometer Program	-	-	-	MCPGM RDMTR	MCPGM
RDXXX	63433	U-Tag of Right Ascension/ Declination Display Program	-	-	-	MCPGM	MCPGM
RECAZIM	67ØØØ	Azimuth Input Buffer for Previous Frame	-	REV	B19		
RECELEV	7ØØØØ	Elevation Input Buffer for Previous Frame	-	REV	B19		

LABEL	LOCATION	DEFINITION	NORMAL VALUE	UNITS	SCALE	SET BY	USED BY
RECFILE	63212	Address of block to be recorded L ≡ FWA U ≡ LWA	-	-	-	MCPGM (Any Program)	RECRD
RECORDSIZE	63112	System Cycle Rate Indicator +Ø = Normal Cycle −Ø = High Speed	-	-	-	TIMEP	TIMEP MCPGM RADEC
RECRD	63415	U-Tag of Recording Program	-	-	-	MCPGM RECRD	MCPGM
RECRDSWTCH	63155	Amount of Recording Indicator L ≡ Ø → Complete Recording L ≡ 1 → Partial Recording L ≡ 2 → No Recording	Ø	-	BØ	RECRD	MCPGM
RELEASESW	63156	Recording "Done" Indicator +Ø → Recording Done ≠Ø → Recording not Done	Ø	-	BØ	RECRD	MCGPM
SAZIM	63Ø55	Azimuth with Scan	-	REV	B27	AESCN	CORCT RADEC
SCELTIME	63134	CELTIME for the Celestial Scan Program	-	DAYS	B28	MCPGM TIMEP	ADSCN
SDEC	63ØØ5	Declination with Scan	-	REV	B27	ADSCN	COCON RADEC
SECONDS	6314Ø	Declination with Scan	-	REV	B27	ADSCN	COCON RADEC
SELEV	63Ø56	Elevation with Scan	-	REV	B27	AESCN	CORCT RADEC
SIDERTIME	63Ø12	Right Ascension of Site at CONVERTIME	-	RAD	B26	COCON	CELPGA COCON RADEC

LABEL	LOCATION	DEFINITION	NORMAL VALUE	UNIT	SCALE	SET BY	USED BY
SINAZEL	63Ø66	Sin of Angle Between Orbit Plane and the Azimuth Plane	-	-	B29	COCON	AESCN
SINORIENT	63Ø64	Sin of Angle Between Orbit Plane and the Meridian	-	-	B29	MCPGM BELTP SATEL	COCON
SKIP	63331	Link to Univac's Utility System "TOPS"	-	-	-	SYS-LOADER	MCPGM
SRA	63ØØ4	Right Ascension with Scan	-	REV	B27	ADSCN	COCON RADEC
SRADTIME	63136	CELTIME for the Radar Scan Program	-	DAYS	B28	MCPGM TIMEP	AESCN
SYNCTIMING	63542	G.M.T. Modulo 24 hours at ~ Start of Frame	-	DAYS	B28	MCPGM	TIMEP
SYSCOMREG1	63452	U ≦ MCP Linkage for TIMEP L ≦ MCP Linkage for CHPAR	-	-	-	MCPGM	TIMEP CHPAR
SYSCOMREG2	63453	U ≦ Flag Set by Certain DPP's U ≦ + Ø → Normal return to wait loop U ≦ − Ø → Special action by MCPGM	-	-	-	DPPGM	MCPGM
SYSCOMREG3	63454	L ≦ Flag set by Certain DPP's L ≦ + Ø → Normal action in Az, Buf, Chain L ≦ + Ø → MCPGM enter DPP in Az, Buf, Chain via RJP L(SYSCOMREG3)	-	-	-	DPPGM	MCPGM
SYSCOMREG4	63455	Spare	-	-	-		

LABEL	LOCATION	DEFINITION	NORMAL VALUE	UNIT	SCALE	SET BY	USED BY
SYSCOMREG5	63456	Spare	-	-	-		
SYSCOMREG6	63457	Spare	-	-	-		
SYSENTRIES	776ØØ	U-Tag Table	-	-	-	SYS-LOADER	MCPGM
SYSNAMES	777ØØ	System Name Table	-	-	-	SYS-LOADER	MCPGM
SYSTAT1	63313	$U \overset{C}{\neq}$ + Ø Not initializing now $L \overset{C}{\neq}$ – Ø Initializing now $L \overset{C}{\equiv}$ + Ø In Antenna Buf. Mode $L \overset{C}{\equiv}$ – Ø No outputs to antenna	-	-	-	MCPGM	INITIAL-IZATION SECTIONS OF PROGRAMS
SYSTAT2	63314	$U \overset{C}{\neq}$ + Ø Working units in earth radii $U \overset{C}{\equiv}$ – Ø Working units in astro-nomical units	-	-	-	MCPGM	PRINT COCON
		$L \overset{C}{\equiv}$ Celestial point computation program number			BØ	MCPGM	PRINT ACQUI
SYSTATD	63315	Recording Tape Indicator + Ø → Tape not finalized – Ø → Inverse				RECRD	PRINT
TIMECORR	63107	Estimate of time error by the Satellite Acquisition Program	Ø	DAYS	B28	ACQUI	TIMEP
TIMEMODE	63103	Real Time/Simulated Indi-cator + Ø = Real Time – Ø = Simulated Time	-	-	-	TIMEP	MCPGM TIMEP ACQUI INTER
TIMEP	63435	U-Tag of Timing Program	-	-	-	MCPGM	MCPGM

LABEL	LOCATION	DEFINITION	NORMAL VALUE	UNIT	SCALE	SET BY	USED BY
TIMETOHOLD	6352Ø	Time (DSECONDS) at which a Hold Occurred	Ø	SECS	BØ	SCAN	SCAN
TRUERANGE	63Ø63	Range from Site + → E. R.	-	E. R.	B22	COCON	RADEC
		– → A. U.		A. U.	B24		
		Ø → ∞					
TRUETIME	63132	Time of Beginning of Current Frame	-	DAYS	B28	MCPGM TIMEP	PRINT RDMTR
TTYSTATUS	63111	Haystack or Westford Control Indicator + Ø = Haystack – Ø = Westford	-	-	-	MCPGM	KYBRD
TWOSECDOP	63Ø17	First Interpolated Doppler this Frame	-	CPS	BØ	MCPGM	PRINT
VELOFLIGHT	63335	Velocity of Light	161875.	N. M. /sec	BØ	MCPGM	
VIZDEC1	63Ø14						
VIZDEC2	63Ø16						
VIZRA1	63Ø13						
VIZRA2	63Ø15						
WFADD	63450	Contains Locations of the Two Westford Output Buffers	-	-	-	MCPGM	MCPGM WFORD
WFFREQ	63333	Westford Transmitter Frequency	775Ø.	Mc/s	B14	MCPGM CHPAR	WFORD

LABEL	LOCATION	DEFINITION	NORMAL VALUE	UNIT	SCALE	SET BY	USED BY
WFORD	63432	U-Tag of Westford Program	-	-	-	MCPGM	MCPGM
YEARMONTH	63147	U ≦ Year (00 to 99) L ≦ Month (1 to 12)	-	YEAR MONTH	U:B15 L:BØ	TIMEP	CECPGM RDMTR
YRTRAN	63327	Transition in Radar Y axis	-	E.R.	B3Ø	COCON	COCON RADEC
ZRTRAN	6333Ø	Transition in Radar Z axis	-	E.R.	B29	COCON	COCON RADEC

The following table is a rearrangement of the former table, but arranged in numerical order.

LOCATION	LABEL
63ØØØ	IDICELCOR
63ØØ2	RA
63ØØ3	DEC
62ØØ4	SRA
63ØØ5	SDEC
63ØØ6	RADIUS
63ØØ7	RADOT
63Ø1Ø	DECDOT
63Ø11	RADIUSDOT
63Ø12	SIDERTIME
63Ø17	TWOSECDOP
63Ø52	RANGE
63Ø53	AZIM
63Ø54	ELEV
63Ø55	SAZIM
63Ø56	SELEV
63Ø57	CRANGE
63Ø6Ø	CAZIM
63Ø61	CELEV
63Ø62	RANGEDOT
63Ø63	TRUE RANGE
63Ø64	SINORIENT
63Ø65	COSORIENT
63Ø66	SINAZEL
63Ø7Ø	COSAZEL
63Ø71	ACQAZIM
63Ø75	ACQELEV
631Ø1	FRAMESIZE
631Ø2	RADIOMETER

LOCATION	LABEL
631Ø3	TIMEMODE
631Ø4	FIRSTELEV
631Ø5	ASTRORA
631Ø6	ASTRODEC
631Ø7	TIMECORR
6311Ø	KYBRDLEVEL
63111	TTYSTATUS
63112	RECORDSIZE
63113	CELBODY
63132	TRUETIME
63133	CELTIME
63134	SCELTIME
63135	CONVERTIME
63136	SRADTIME
63137	HOURMINUTE
6314Ø	SECONDS
63141	DSECONDS
63142	ACTUALTIME
63143	ESTSHIFTED
63144	GMTSHIFTED
63145	GMTMODU24
63146	BLASTOFF
63147	YEARMONTH
6315Ø	DAY
63151	HOURREG
63152	MINREG
63153	FIRSTHRU
63154	DUMSECTTG
63155	RECRDSWITCH

LOCATION	LABEL
63156	RELEASESW
63157	RADINDIC
63212	RECFILE
63312	RADARMODE
63313	SYSTAT1
63314	SYSTAT2
63315	SYSTATD
63316	DELTATEE
63317	FREQUENCY
6332Ø	LONGITUDE
63321	GEODETLAT
63322	GEOCENLAT
63323	EQUATOR
63324	POLE
63325	AZIMOVER
63326	HEIGHT
63327	YRTRAN
6333Ø	ZRTRAN
63331	SKIP
63332	MSFREQ
63333	WFFREQ
63334	MAINSWITCH
63335	VELOFLIGHT
63336	LSPERAU
63337	FLATTENING
6334Ø	NMPERAU
63341	AUPEREQUAT
63342	KMPERNM
6335Ø	EXPNAME
63412	MCPGM
63413	INTER

LOCATION	LABEL
63414	COCON
63415	RECORD
63416	ADSCN
63417	AESCN
6342Ø	CORCT
63421	DYDMP
63422	CHCOR
63423	PRLOG
63424	CELCOMPGM
63425	DATANALYZE
63426	INTERCOM
63427	ACQUI
6343Ø	RDMTR
63431	CHPAR
63432	WFORD
63433	RDXXX
63434	PLANP
63435	TIMEP
63436	PLOTP
63442	AZIMADD
63443	ELEVADD
63444	DOPPADD
63445	RANGEADD
63446	INAZIMADD
63447	INELEVADD
6345Ø	WFADD
63451	MILLSTNADD
63452	SYSCOMREG1
63453	SYSCOMREG2
63454	SYSCOMREG3
63455	SYSCOMREG4

LOCATION	LABEL
63456	SYSCOMREG5
63457	SYCOMREG
6346Ø	INTERLCKSW
63461	PREVIOUSTM
63462	BODYSIZE
635ØØ	AZELBXSCAN
635Ø1	AZMTHSCAN
635Ø2	ELVTNSCAN
635Ø3	RADCBXSCAN
635Ø4	RASCNSCAN
635Ø5	DECLINSCAN
635Ø6	ALNGACRSCN
635Ø7	AEBOXLINES
6351Ø	RDBOXLINES
63511	HOLDNOHOLD
63512	AZIMOFFSET
63513	ELEVOFFSET
63514	RAOFFSET
63515	DECOFFSET
63516	CRSSOFFSET
63517	ALNGOFFSET
6352Ø	TIMETOHOLD
63521	PERIODELEV
63522	ARCOFELEV
63523	PERIODAZIM
63524	ARCOFAZIM
63525	PERIODEC
63526	ARCOFDEC
63527	PERIODRA
6353Ø	ARCOFRA
63531	RADECOTIME
63532	AZELOTIME
6354Ø	RADORA
63541	RADIODEC
63542	SYNCTIMING
64ØØØ or 72ØØØ	AZIMOUT
65ØØØ or 73ØØØ	ELEVOUT
66ØØØ or 74ØØØ	DOPPOUT
67ØØØ or 75ØØØ	RECAZIM
7ØØØØ or 76ØØØ	RECELEV
7Ø777 or 76777	RANGEOUT
71ØØØ	MCPFILLER
72ØØØ or 64ØØØ	INTERAZIM
73ØØØ or 65ØØØ	INTERELEV
74ØØØ or 66ØØØ	INTERDOPP
75ØØØ or 67ØØØ	AZIMIN
76ØØØ or 7ØØØØ	ELEVIN

LOCATION	LABEL
76777 or 7Ø777	INTERRANGE
776ØØ	SYSENTRIES
777ØØ	SYSNAMES

APPENDIX C
Subprogram Names

Each of the operating programs has a five-character name which appears as the second word of each program. This system name is used by the utility programs which make up the system tape. The names of the in-core programs appear in the block of common storage registers called SYSNAMES. The system names of the celestial computation and data processing programs appear as the first word of the record containing the program on the bootstrap tape and is used in the search mode of reading magnetic tape. The program name is one chosen by the programmer and may be up to 10 characters. In the following IC stands for incore, CC for celestial computation, and DP for data processing.

SYSTEM NAME	PROGRAM NAME	TYPE OF PROGRAM	PROGRAM	REFERENCE
ACQUI	ACQUI	IC	Satellite Acquisition	16
ADSCN	SCAN	IC	Celestial Scan	19
AESCN	DUMSCAN	IC	Radar Scan	19
BELTP	BELTP	CC	West Ford Belt	15
CHCOR	CHANGECORE	IC	Dynamic Core Change	8
CHPAR	PARAMETER	IC	Parameter Change	8
COCON	COCON	IC	Coordinate Conversion	4
CORCT	CORCT	IC	Antenna Correction	18
DYDMP	DYDMPPGM	IC	Dynamic Dump	8
FRADC	FXRADEC	CC	Fixed Right Ascension-Declination	8
FXANE	FXAZEL	CC	Fixed Azimuth-Elevation	8
INTER	INTER	IC	Interpolation	3
KYBRD	NTERCOM	IC	Intercom	6
MCPGM	MCP	IC	Master Control	in hoc
MOONP	MOONTRACK	CC	Moon	12
PDMTR	RDMTRSCAN	DP	Radiometer Scan	
PLANP	PLANNER	IC	Planning	8
PLNET	PLANETRACK	CC	Planet	11

SYSTEM NAME	PROGRAM NAME	TYPE OF PROGRAM	PROGRAM	REFERENCE
PLOTP	PLOTP	IC	Strip Chart Recorder	8
PRINT	PRINTOUT	CC	Printout of Recording	9
PRLOG	PRLOG	IC	High Speed Printer Logging	8
RADEC	RADEC	IC	Right Ascension-Declination Display	4
RDMTR	RADIOMETER	DP	Radiometer Processing	17
RECRD	RECORDING	IC	Magnetic Tape Recording	8
SATEL	SATEL	CC	Satellite	14
STARP	STARTRACK	CC	Star	10
SUNPG	SUNTRACK	CC	Sun	13
TIMEP	TIMING	IC	Timing	in hoc
WFORD	WESTFORD	IC	Intersite Coupling	8

APPENDIX D
System Constants and Conversion Factors

Whenever the Haystack Pointing system is effectively "bootstrapped" anew, MCP sets up certain common storage registers to contain astronomical and geological constants which are intended for system-wide use. These values are compiled into MCP and override any changes made by the change parameter program whenever the system is so bootstrapped. These constants and conversion factors are listed below alphabetically by their common storage names.

AUPEREQUAT .0000426356 1($\times 10^4$) B28

The number of astronomical units (A. U.) in one equatorial earth radius (E. E. R.) times 10000.

DELTATEE .00040509 days B28

Ephemeris time minus universal time (35 seconds)

EQUATOR 3443.9525 B17

Nautical miles (N. M.) in one equatorial earth radius.

FLATTENING .003367 B28

(Equatorial earth radius minus polar earth radius)/equatorial earth radius.

FREQUENCY 7750 Mc/s B14

Haystack transmitter frequency.

GEODETLAT $42.^{o}6233$ B20

Haystack geodetic latitude.

HEIGHT 475. ft. B0

Haystack antenna height above mean sea level.

KMPERNM 1.852 B28

Kilometers in one nautical mile.

LONGITUDE	$288.^{o}5113$ E	B20

Haystack east longitude.

LSPERAU	499.005	B20

Light seconds per astronomical unit.

MSFREQ	1295. Mc/s	B14

Millstone Hill transmitter frequency.

NMPERAU	80776434	B0

Nautical miles per astronomical unit.

POLE	3432.3567 N. M.	B17

Nautical miles in one polar earth radius.

VELOFLIGHT	161875 N.M. /SEC	B0

Velocity of light in nautical miles per second.

WFFREQ	7750 Mc/s	B14

West Ford transmitter frequency.

APPENDIX E
System/User Dialogue

Listed herein are all of the questions and information typeouts originating within the Master Control Program (MCP) and the Timing Program (TIMING). They are grouped into three main categories - 1) Initialization Procedures, 2) Attention Symbol Sequences, and 3) Special Typeouts.

The presentation of the typeouts within categories is chronological to the extent that this is possible. An attempt is made to describe the context in which the typeout is made and the manner in which control interprets user replies. For cross reference purposes typeouts are labeled a), b), c) etc.

Where not indicated to the contrary, a carriage return reply results in using the previously entered (or compiled-in) reply to the question at hand.

1. Initialization Procedure

a) TITLE

MCP at the start of any run invites the user to identify the experiment by typing in as many as 75 alphanumeric and control characters (excluding, of course, the carriage return and attention symbol keys). Whatever the user types in at this point (terminated by a carriage return here as in all other cases) will be written on the system data recording tape as part of the so-called TITLE record. A carriage return reply results in no user identification, but the title record will be written.

b) GREENWICH MONTH (1-12)

c) GREENWICH DAY (1-31)

These questions are asked by TIMING at load (bootstrap) time and subsequently only if the user indicates that a non real-time run is desired.

d) HHMM IS THE PRESENT GMT

Timing has read the 100 μs real-time clock and is reporting the current Greenwich Mean Time for information only.

e) TYPE OF RUN... REAL TIME(0) OR SIMULATION(1)

Timing still has control and is asking the experimenter to indicate the broad class of run in which he is interested. An answer of (0) real time, will lead to one line of questioning (see f) while an answer of 1, to quite another (see h). A carriage return reply is equivalent to answering (0), "real time".

f) START... AS SOON AS POSSIBLE (0) OR AT A SPECIFIED GMT (1)

This question, asked by TIMING, will occur immediately after the user has made a (0) "real time" reply to the previous question (e). If (0) is given as an answer here, control will set up to commence output to the antenna on an integral second in the future, occurring virtually immediately after all experiment parameters have been entered and system initialization has been completed. An answer of (1) will be given if the user chooses to delay the start of output data until a certain future real time is reached. A carriage return reply is equivalent to a (0) answer.

g) SPECIFIC GMT (HHMM)

This question by TIMING comes in response to the user's answering (1) to question f. At this point the user must indicate the GMT (to the nearest minute) at which he wishes the system to send out its first data. Output will occur at the zeroth second of the indicated HHMM. It should be noted that if the user for any reason enters a time-to-go which is at that time or later becomes, earlier than real time at the instant the program begins to wait for time-to-go to occur, he has effectively answered question f) with a (0) "as soon as possible".

h) FICTITIOUS TIME... INCREMENTED (0) OR STATIONARY (1)

The user has just indicated, in response to e), that a simulation run is desired. TIMING now wants to know whether successive outputs will be for successive times or for one constant time. (This single constant time is variable via reinitialization of the TIMING program as will be shown below).

A carriage return reply is interpreted as (0) "incremented time".

i) GMT FOR FIRST COMPUTED POINT (HHMMSS)

Up to this point the user has chosen a simulation run with incremented time. TIMING now asks for the first fictitious time (to the nearest second) for which meaningful printouts will later be available.

j) INCREMENT TO GMT (IN SECONDS) FOR SUCCESSIVE POINTS

Having specified in response to question i), the effective start time for this simulation run, the user must now indicate a delta value for the simulated time. This is the incremental value that will be added successively to the effective start time to simulate the passage of time. The maximum value for this delta time is 10800 seconds (3 hours).

k) RUN DURATION IN DAYS

The two day time limit on system running does not hold in the simulation mode so the user may specify here (to the nearest two days) how many simulated days worth of data he desires. A carriage return reply causes the system to run virtually indefinitely.

ℓ) SYSTEM CYCLE TIME... 1/4 SEC(0) OR 2 SEC (1)

Here TIMING is effectively asking about the output data rate. If one chooses (0) "1/4 sec" the system will cycle without regard to the normal 2 second interrupt from the azimuth output channel, and will output data points at a rate of about 4 per second. Choosing (1), of course, causes the system to wait for the interrupt before recycling which results in a normal output data rate. A carriage return reply is equivalent to a (0) "1/4 sec".

m) INITIAL CHOICE OF GMT (HHMMSS)

This question by TIMING is the one which will occur immediately after question h), in the event that the user has indicated that he desired fictitious time to be stationary. This answer implicitly sets the time delta value to zero, the run duration to indefinite and the data output rate to 4 per second. The initial choice of stationary time typed in at this point can be varied once the system is cycling.

n) BELT(1) SAT(2) AZ-EL(3) SUN(4) STAR(5) PLANET(6) MOON(7) RA-DEC(8)

TIMING has now returned control to MCP. The user must now select the one of the eight available celestial computation programs necessary for the experiment. If the program chosen is not already in memory, MCP affects its read-in from the Master Bootstrap Tape. In either event initialization of the chosen program begins and the questions and information typeouts peculiar to that particular program ensue.

o) SYSTEM DATA RECORDING. . . COMPLETE(0) PARTIAL(1) NONE(2)

This question is in fact output at this point by the recording program rather than by MCP. The question, however, is largely a control function and as such is included here. If (0) is chosen as an answer, the entire contents of common storage, including all values that are computed directly as well as all incoming data and outgoing interpolated data,will be recorded (currently 6000_8 words). A partial recording (choice 1) results in the recording of only the directly computed values (151_8 words). The third choice is to have none of common storage recorded.

It can be seen that in the simulation mode the output data rate will fall into one of three classes.

(1) Low - when the cycle rate is once per 2 seconds.

(2) Medium - when the cycle rate is once per 1/4 second but with a complete recording requirement.

(3) High - when the cycle rate is once per 1/4 second and the recording requested is "partial" or "none".

A carriage return reply to this question is equivalent to (0) "complete".

p) DATA PROCESSING PROGRAM. . . NONE(0) RADIOMETER(1) RADIOMETER SCAN(2) MERCURY EXP(3)

MCP now offers its choices of data processing programs. If the chosen program is not already in core memory, it will be read in and initialized in the same fashion as was the celestial computation program. A carriage return reply is equivalent to choice(0) "none".

At this point the initialization of the system is complete. Future typeouts by control will be as a result of the attention symbol being struck or some other special happening. These are discussed in the next sections.

2. Attention Symbol Sequences

The attention symbol may be struck by the experimenter at any time to tell the system that some special action is to be initiated immediately. The typeout in response to striking the key is as follows:

a) SIGN OFF(1) MOD(2) NEXT RUN(3) PRINT(4)

If the system is pointing when attention is called for it will continue to cycle while seemingly simultaneously servicing the user's request.

If the user elects (1) "sign off", MCP will terminate any output to the antenna, finalize the recording program which will end file and unload the data recording tape, reinitialize all common storage registers and report ready to recycle by starting the initialization procedure with typeout 1a, "TITLE"

If choice (2) "mod" is made, MCP will counter with its next lower level typeout in this sequence (see below).

If choice (3) "next run" is elected MCP terminates output but does not reinitialize common storage before proceeding to typeout 1a.

Choice (4) "print" causes MCP to terminate output and then to read in from the Master Bootstrap Tape the print program, overlaying the celestial computation program. Control is then passed to the print program which now assumes the role of control program, permitting the attention symbol to remain active.

For the initiated there is a fifth, unlisted choice of replies to this question, namely, (0). Selection of (0) results in a transfer to Univac's utility system TOPS.

b) CCPGM*(1) DATA PROCESSING(2) SCAN(3) RECORDING(4)
TIMING(5) OTHER(6)

This typeout occurs when the user has elected choice (2) "mod" to the previous question.

Choices (1) through (5) result in the users being "connected to" the indicated individual program for reinitialization purposes.

*CCPGM is for illustration only. In operation a five character mnemonic representing the previously chosen celestial computation program is typed.

Choice (6) results in the next lower level typeout in this sequence (see below).

c) RA-DEC DISPLAY(1) CORRECTION(2) PARAMETERS(3)
ACQUISITION(4) CC(5) DYDMP(6) PLOT(7)

The user has chosen (6) as his answer to the previous question. MCP now lists the seven additional programs with which communication is possible for re-initialization purposes. (CC and DYDMP are mnemonics for the change core and dynamic dump programs respectively).

d) ENTER(AT WILL) NEW SIMULATED GMT (HHMMSS)

For this typeout to occur at all the system must be cycling in the simulation-stationary time mode and the user must have answered (5) to question b) above. TIMING is inviting the user to change the originally specified stationary GMT. New values may be continuously entered.

3. Special Typeouts

Provisions to inform the user of unusual or special occurrences have been incorporated into the control structure.

a) PNAME IS NOT IN MEMORY

MCP in its initialization has discovered that a resident in-core program is missing. The missing program, typified by PNAME in the typeout, will never be called. Operation will continue but at the user's risk. This typeout occurs upon "bootstrapping" but not at subsequent "next runs".

b) NEW DAY OF THE YEAR DETECTED... NOW IN FORCE

In reading the real-time clock TIMING has noted that the present time is earlier than the last time the clock was read. A midnite crossing is assumed and the day of the year and day of the month values are incremented by one.

c) PNAME IS NOT ON THIS SYSTEM TAPE

The user has chosen a celestial computation program or a data processing program (typified by PNAME in the typeout) which MCP has been unable to locate on the particular Master Bootstrap Tape being used. In this case the previous typeout (either ln or lp) is repeated allowing the user to make a second choice.

d) CKSUM ERROR... RETRYING

Again the situation is centered about MCP reading a celestial computation program or a data processing program from the Master Bootstrap Tape. Here, however, MCP has found the program, read it in, received a normal status indication from the hardware, but computed checksum disagrees with the checksum precomputed by SYSLOADER. MCP will reread the record indefinitely until a checksum match is obtained.

e) THE SYSTEM IS AT AN IMPASSE...

(0) RE-ENTER CELESTIAL PROGRAM
(1) NEW CELESTIAL CHOICE
(2) RESTART

The chosen celestial computation program in its initialization section has detected an error condition which prevents it from continuing. An exit has been made to MCP's error return where the user must decide whether to try again (choice 0), to pick a different celestial program (choice 1) or to start again from the beginning (choice 2).

f) CATASTROPHIC ERROR... ABORTING

In this case the chosen celestial computation program has again detected a non recoverable error condition. This time, however, the error arose in the working section of the program which says that the system either is pointing or is tantamount to cycling. MCP immediately terminates output to the antenna, announces the error and reports ready to restart with the typeout "TITLE".

g. SYSTEM TIME LIMIT REACHED PRINT RESULTS NOW...YES(0) OR NO(1)

The working section of TIMING has sensed that in the case of real-time operation the two day system time limit has been reached or in the case of a simulation run the number of simulated days running specified has elapsed. If the user wishes to process the recorded data now he will answer (0) (or a carriage return) to the above question and TIMING will endfile and rewind the recording tape and via MCP transfer to the print program. Answering (1) will direct the system to a "next run" situation starting with the typeout "TITLE".

h) SYSTEM TIMING OUT OF SYNCH. . . MUST ABORT

In the real-time mode of operation, TIMING has discovered that the real-time clock and the internal program clock differ by more than 3.8 ms. Output to the antenna is immediately terminated and a return to MCP is made where the typeout "TITLE" occurs.

APPENDIX F
Typical Dialogue Sequences

Typical discourses resulting in the real-time operating mode and the simulated modes are given in this appendix. Figures 4 and 5 are real time, while Fig. 6 and 7 are simulated.

Figure 4 is an example of a real-time run which is to start as soon as the system is initialized. This is the usual case.

Figure 5 is again a real-time run, but now the system will wait until the selected time, here 1905 GMT, before going into the two-second cycle. In the example, the system is probably finished initializing before 1900, since the main body of the initialization takes place after 1857 GMT. Thus, there would be about a five minute wait before the system would begin cycling. This mode may be used, for example, when the time of rise of a satellite or celestial body is known. The advantage is that recording does not begin until the system is cycling so that all data recorded is pertinent.

Figure 6 shows the usual type of simulated run. Coordinates of the moon at 10 minute increments starting at 0 hours of December 1 and continuing for the whole month are computed. The short cycle time has been selected so that each point takes about 1/4 second to obtain. The whole month (actually 32 days since the basic run is a two-day run) would, therefore, be computed in $32 \times \frac{1440}{10} \times \frac{1}{4}$ = 1152 seconds. To this must be added the time to read in the moon ephemerides from magnetic tape every two days of simulated time which may be on the order of 10 seconds per loop up or a total of 160 seconds. Thus, the whole run is finished in about 22 or 23 minutes.

Had the increment to GMT been chosen as 0, the cycle time to 2 seconds, and the initial time to say 1920, the antenna would have been held stationary, and the moon would have drifted through the beam as the earth turned, being dead center (hopefully) at the real time of 1920.

Figure 7 depicts a stationary time run. Here the computer continually computes the position of Virgo A at $21^h30^m15^s$ GMT. Upon reinitialization via the attention symbol route the experimenter chooses to find the coordinates at $21^h32^m00^s$ and then at $21^h32^m01^s$. This mode is usually used to find a single answer.

For example, by looking at the azimuth lights and fiddling with time, one can find the time of transit (azimuth equal 0^{o} or 180^{o}) to the nearest second.

```
TITLE
      SAMPLE RUN. . . . REAL TIME. . START AS SOON AS POSSIBLE. . . . *

GREENWICH MONTH (1-12)
      11*

GREENWICH DAY (1-31)
      12*

1853  IS THE PRESENT GMT

TYPE OF RUN. . . . REAL TIME (0) OR SIMULATION (1)
      Ø*

START. . . AS SOON AS POSSIBLE (0) OR AT A SPECIFIED GMT (1)
      Ø*

BELT(1) SAT(2) AZ-EL(3) SUN(4) STAR(5) PLANET(6) MOON(7) RA-DEC(8)
      6*

MERCURY(1) VENUS(2) MARS(4) JUPITER(5) SATURN(6) URANUS(7) NEPTUNE(8)
      4*

RIGHT ASC        1ØH 24M 1Ø. 32S

DECLINATION      11D 56'  15. 11"

DAY OF YEAR      317

UNIVERSAL        18H 53M 31. ØØS
  TIME

DISTANCE AU      1. 537Ø673

PLANET           MARS

SYSTEM DATA RECORDING. . . COMPLETE(0) PARTIAL(1) NONE(2)
      Ø*

DATA PROCESSING PROGRAM. . . NONE(0) RADIOMETER(1) RADIOMETER SCAN(2)
MERCURY EXP(3)
      Ø*

(THE SYSTEM IS NOW CYCLING)
```

Fig. 4. Sample real-time run with no delay in starting.

```
TITLE
        SAMPLE RUN....REAL TIME...DELAYED START....*

GREENWICH MONTH (1-12)
        11*

GREENWICH DAY (1-31)
        12*

1857 IS THE PRESENT GMT

TYPE OF RUN....REAL TIME(0) OR SIMULATION(1)
        Ø*

START...AS SOON AS POSSIBLE(0) OR AT A SPECIFIED GMT(1)
        1*

SPECIFIC GMT START (HHMM)
        19Ø5*

BELT(1) SAT(2) AZ-EL(3) SUN(4) STAR(5) PLANET(6) MOON(7) RA-DEC(8)
        7*

RIGHT ASC          21H 49M 59.89S

DECLINATION        –17D 55'  47.44"

DAY OF YEAR        317

UNIVERSAL TIME     19H 5M Ø.ØØS

DISTANCE E R       62.197968

OBJECT             MOON

SYSTEM DATA RECORDING...COMPLETE(0) PARTIAL(1) NONE(2)
        Ø

DATA PROCESSING PROGRAM...NONE(0) RADIOMETER(1) RADIOMETER SCAN(2)
MERCURY EXP(3)
        Ø*

(THE SYSTEM IS NOW WAITING FOR  19Ø5 GMT)
```

Fig. 5. Sample real-time run with delayed start.

```
TITLE
        SAMPLE SIMULATION RUN. . . WITH TIME INCREMENTED. . . . *

GREENWICH MONTH I-12)
        12*

GREENWICH DAY (1-31)
        1*

191Ø IS THE PRESENT GMT

TYPE OF RUN. . . . REAL TIME(0) OR SIMULATION(1)
        I*

FICTITIOUS TIME. . INCREMENTED(0) OR STATIONARY(1)
        Ø*

GMT FOR FIRST COMPUTED POINT (HHMMSS)
        ØØØØØØ*

INCREMENT TO GMT (IN SECONDS) FOR SUCCESSIVE POINTS
        6ØØ*

RUN DURATION IN DAYS
        31*

SYSTEM CYCLE TIME. . 1/4 SEC. (0) OR 2 SEC. (1)
        Ø*

BELT(1) SAT(2) AZ-EL(3) SUN(4) STAR(5) PLANET(6) MOON(7) RA-DEC(8)
        7*

RIGHT ASC          14H 15M 5Ø. 6ØS
DECLINATION        -9D 27'  5. 77"
DAY OF YEAR        336
UNIVERSAL TIME     ØH ØM Ø. ØØS
DISTANCE E R       62. 248ØØ8
OBJECT             MOON

SYSTEM DATA RECORDING. . . COMPLETE(0) PARTIAL(1) NONE(2)
        1*

DATA PROCESSING PROGRAM. . . NONE(0) RADIOMETER(1) RADIOMETER SCAN(2)
MERCURY EXP(3)
        Ø*

(SYSTEM IS NOW CYCLING IN HIGH SPEED)
```

Fig. 6. Sample simulation run with time incremented.

```
TITLE
        SAMPLE SIMULATION RUN... WITH TIME STATIONARY.... *

GREENWICH MONTH (1-12)
        11*

GREENWICH DAY (1-31)
        16*

1917 IS THE PRESENT GMT

TYPE OF RUN.... REAL TIME(0) OR SIMULATION(1)
        1*

FICTITIOUS TIME.. INCREMENTED(0) OR STATIONARY(1)
        1*

INITIAL CHOICE OF GMT (HHMMSS)
        213Ø15*

BELT(1) SAT(2) AZ-EL(3) SUN(4) STAR(5) PLANET(6) MOON(7) RA-DEC(8)
        5*

NAME(1) OR RA-DEC(2)
        1*

CASSIOPEIA A(0) CYGNUS A(1) TAURUS A(2) VIRGO A(3) ORION NEBULA(4)
POLARIS(5)
        3*

RIGHT ASC          12H 28M 59.22S
DECLINATION        12D 35'  18.54"
DAY OF YEAR        321
UNIVERSAL TIME     21H 3ØM 15.ØØS
OBJECT             VIRGO A

SYSTEM DATA RECORDING... COMPLETE(0) PARTIAL(1) NONE(2)
        2*

DATA PROCESSING PROGRAM... NONE(0) RADIOMETER(1) RADIOMETER SCAN(2)
MERCURY EXP(3)
        Ø*

SIGN OFF(1) MOD(2) NEXT RUN(3) PRINT(4)
        2*

STAR(1) SCAN(2) RECORDING(3) RADIOMETER(4) TIMING(5) OTHER(6)
        5*

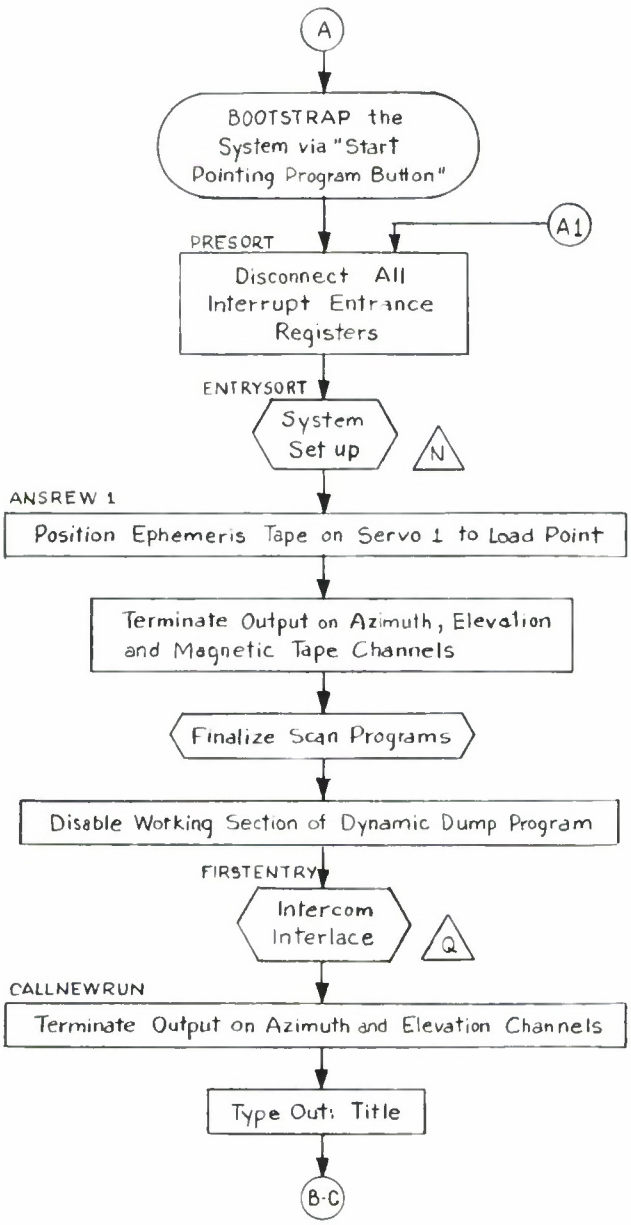
ENTER (AT WILL) NEW SIMULATED GMT (HHMMSS)
        2132ØØ*
        2132Ø1*
```

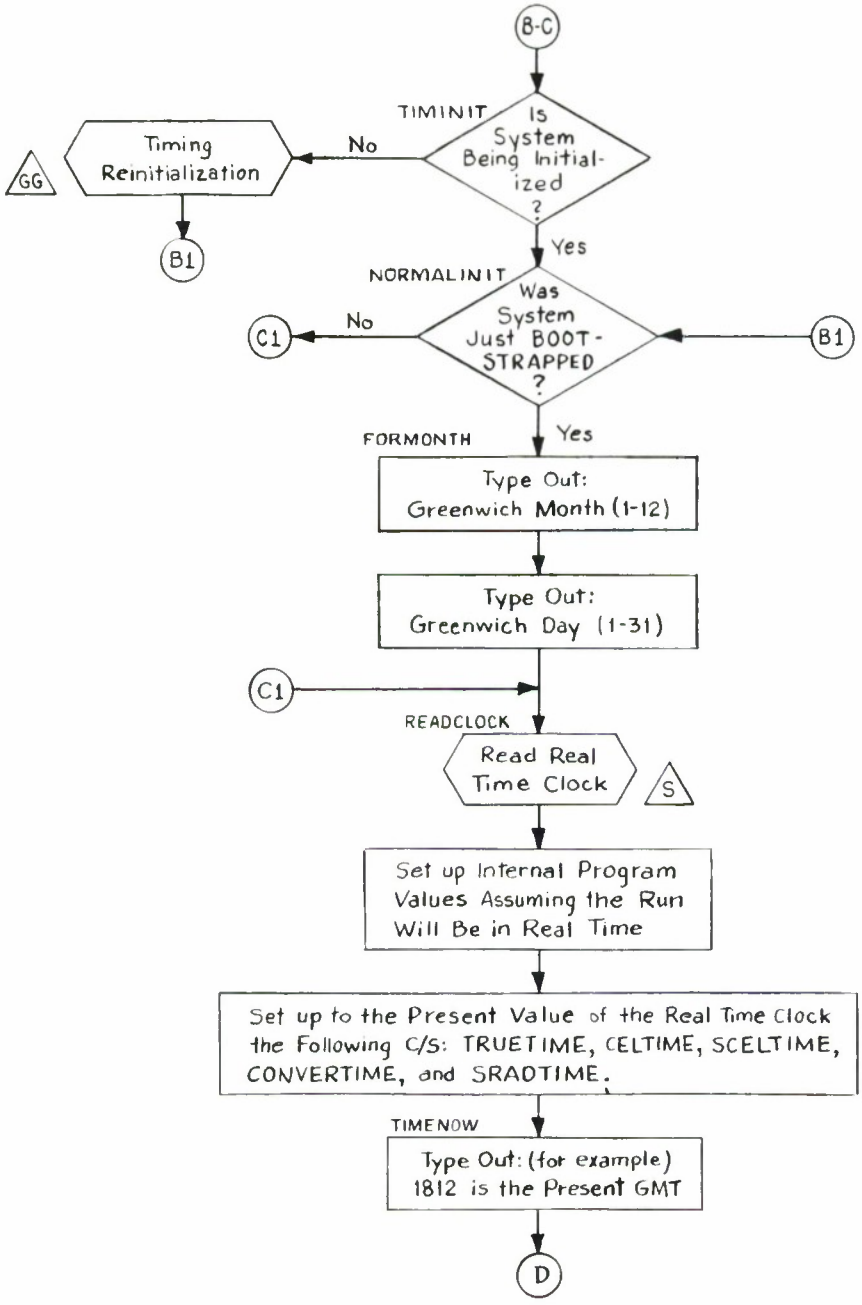
Fig. 7. Sample simulation run with time stationary.

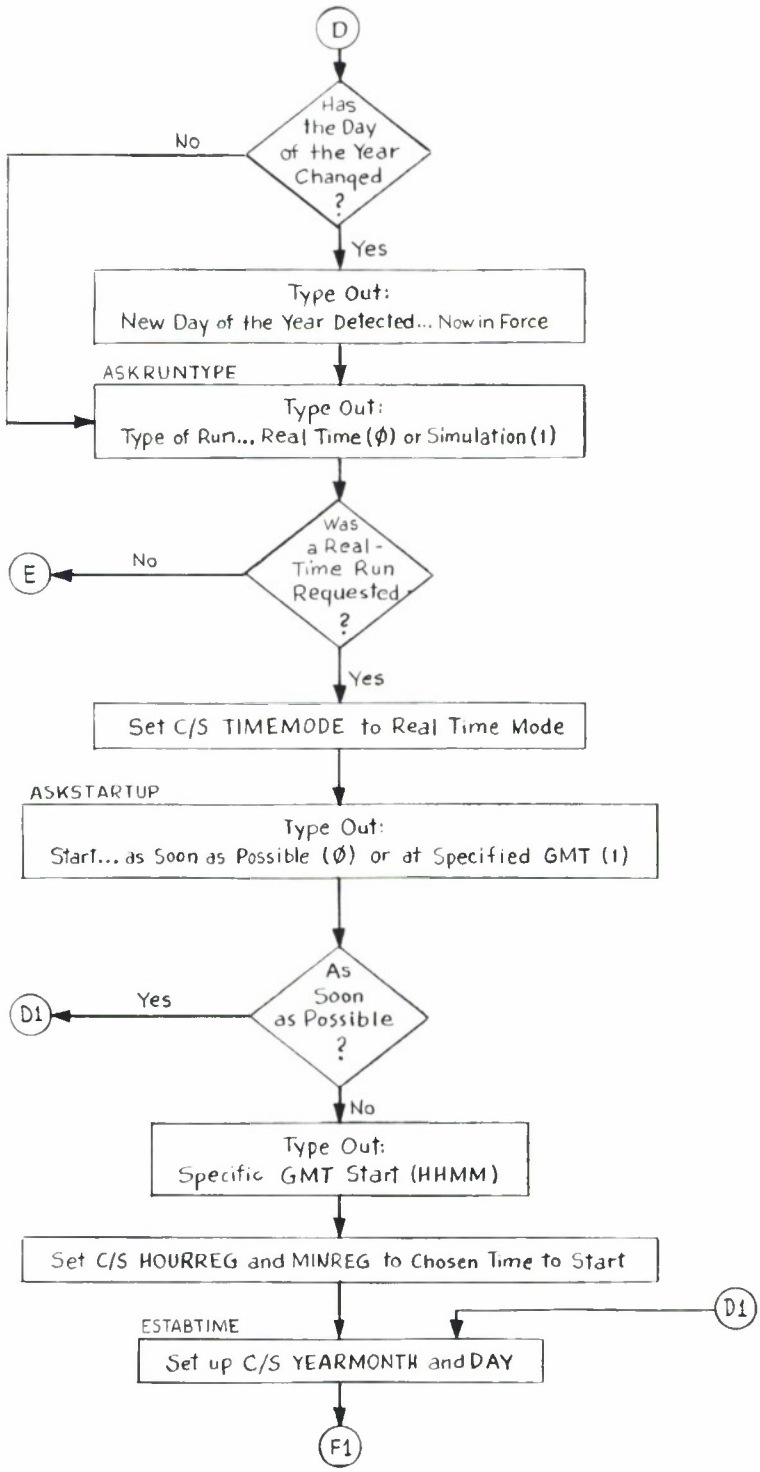
APPENDIX G
System Logic Block Diagram

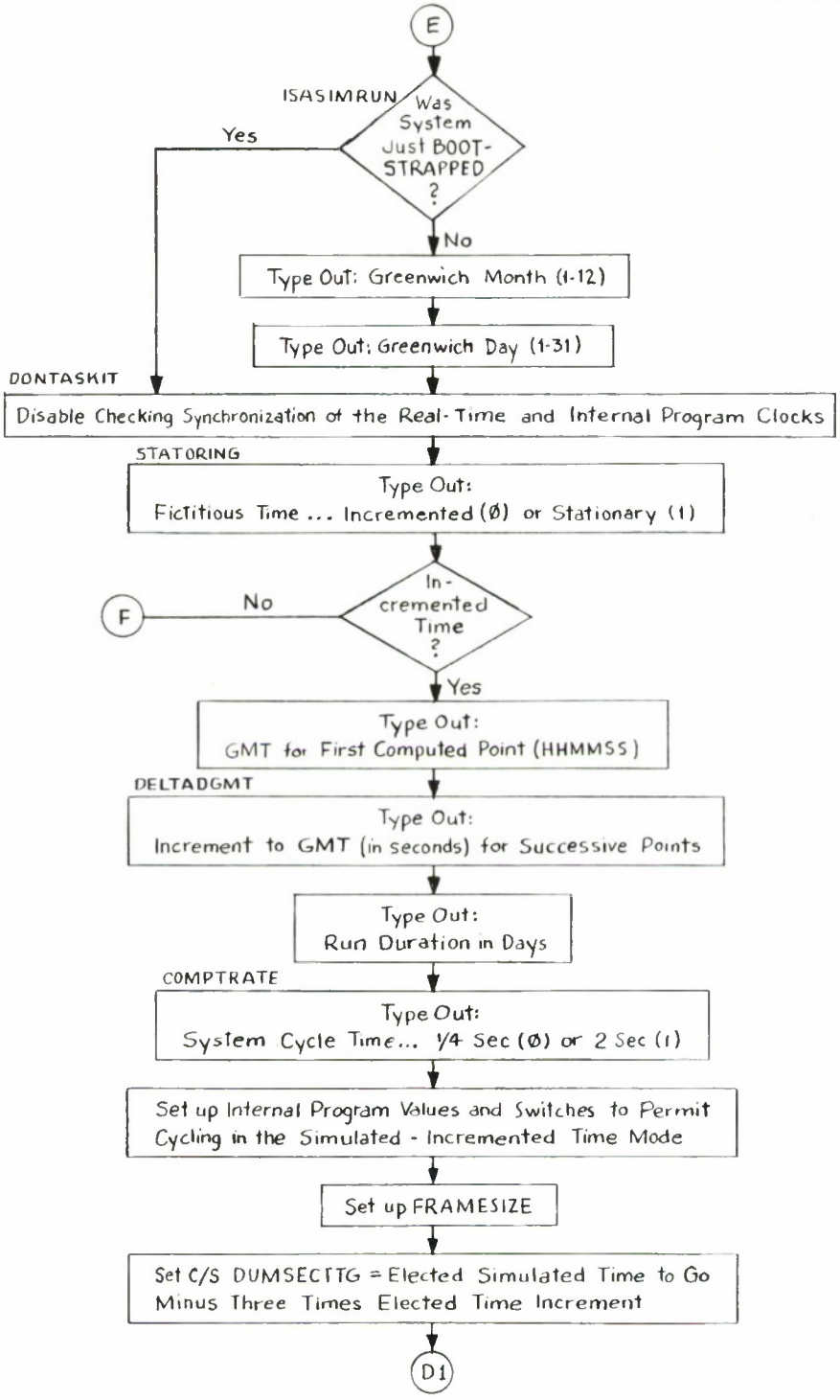
3-82-4553 A

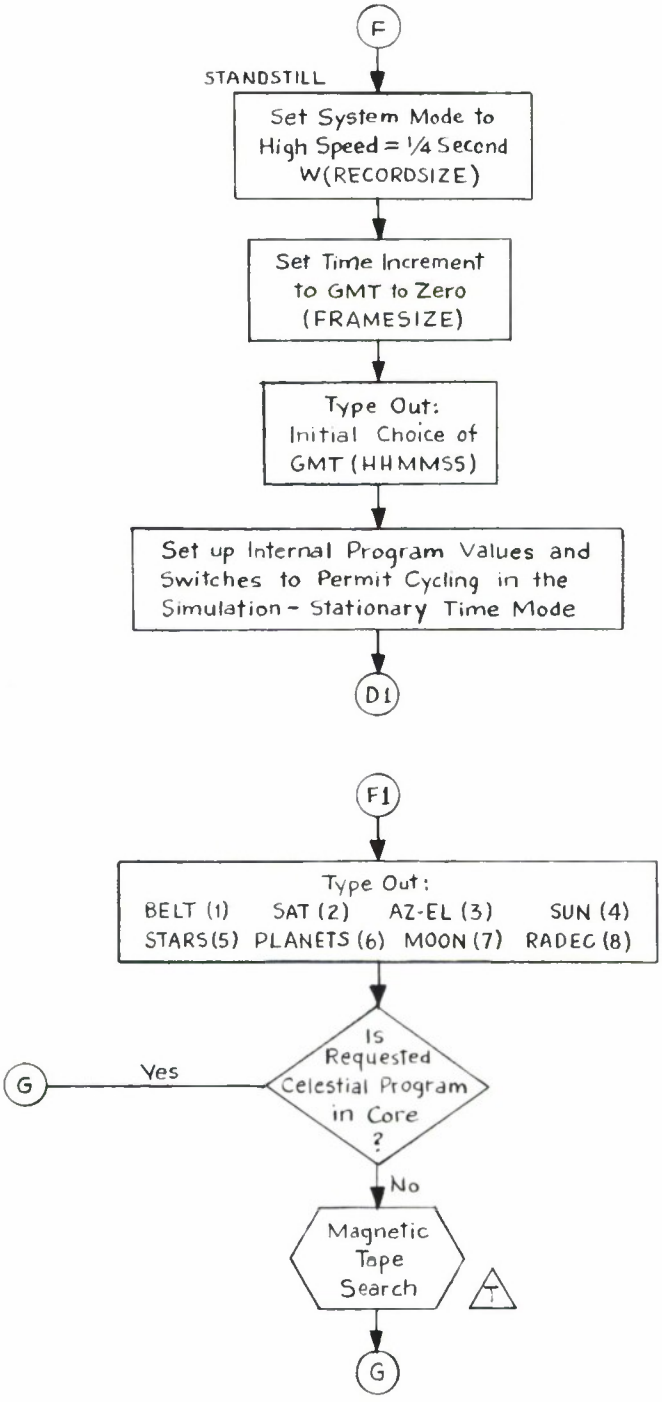
HAYSTACK SYSTEM: CONTROL STRUCTURE FLOW DIAGRAM

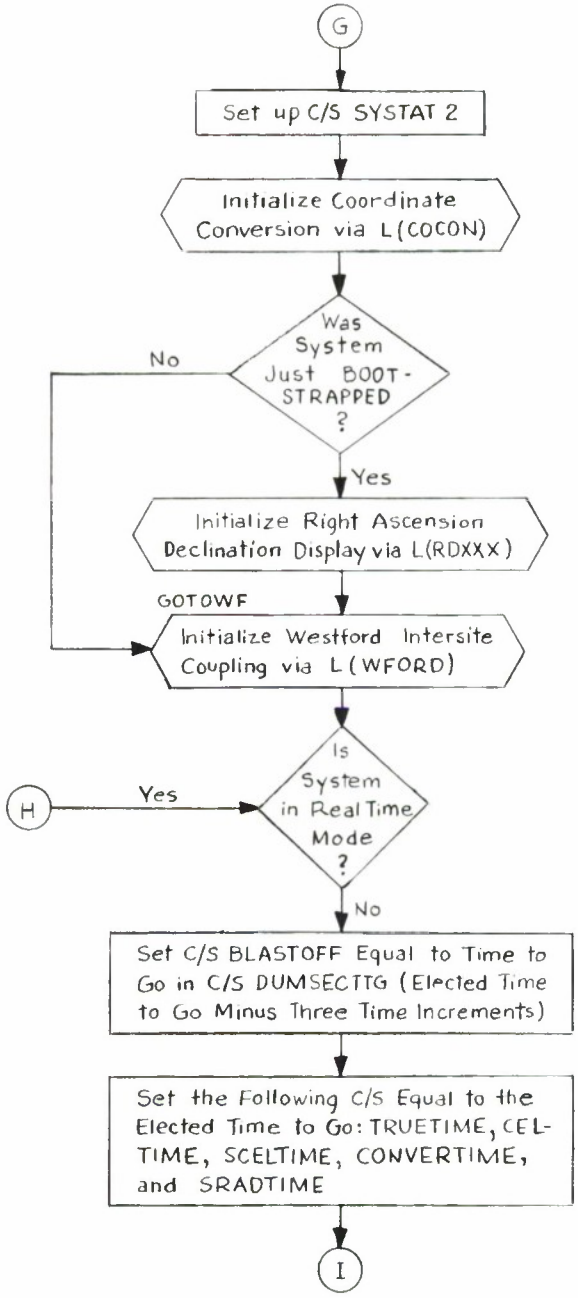



B-C
TIMINIT
Is System Being Initial-ized ?
No
Timing Reinitialization
GG
B1
Yes
NORMALINIT
Was System Just BOOT-STRAPPED ?
No
C1
B1
Yes
FORMONTH
Type Out: Greenwich Month (1-12)
Type Out: Greenwich Day (1-31)
C1
READCLOCK
Read Real Time Clock
S
Set up Internal Program Values Assuming the Run Will Be in Real Time
Set up to the Present Value of the Real Time Clock the Following C/S: TRUETIME, CELTIME, SCELTIME, CONVERTIME, and SRADTIME.
TIMENOW
Type Out: (for example) 1812 is the Present GMT
D


D
Has the Day of the Year Changed ?
No
Yes
Type Out:
New Day of the Year Detected... Now in Force
ASKRUNTYPE
Type Out:
Type of Run... Real Time (Ø) or Simulation (1)
Was a Real-Time Run Requested ?
No
E
Yes
Set C/S TIMEMODE to Real Time Mode
ASKSTARTUP
Type Out:
Start... as Soon as Possible (Ø) or at Specified GMT (1)
As Soon as Possible ?
Yes
D1
No
Type Out:
Specific GMT Start (HHMM)
Set C/S HOURREG and MINREG to Chosen Time to Start
D1
ESTABTIME
Set up C/S YEARMONTH and DAY
F1

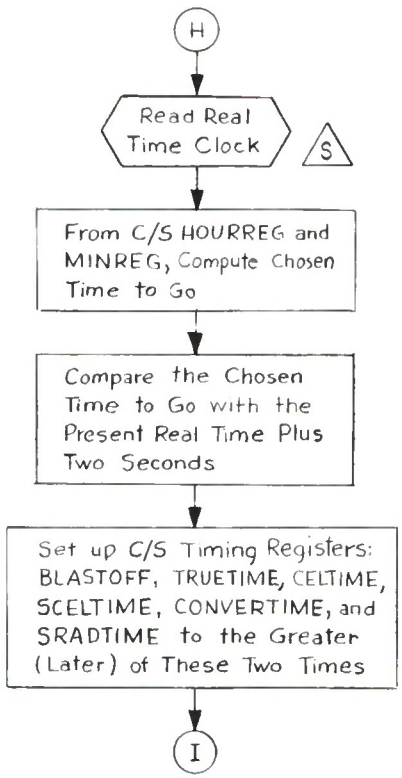

E
ISASIMRUN
Was System Just BOOT-STRAPPED ?
Yes
No
Type Out: Greenwich Month (1-12)
Type Out: Greenwich Day (1-31)
DONTASKIT
Disable Checking Synchronization of the Real-Time and Internal Program Clocks
STATORING
Type Out:
Fictitious Time ... Incremented (Ø) or Stationary (1)
In-cremented Time ?
F
No
Yes
Type Out:
GMT for First Computed Point (HHMMSS)
DELTADGMT
Type Out:
Increment to GMT (in seconds) for Successive Points
Type Out:
Run Duration in Days
COMPTRATE
Type Out:
System Cycle Time... 1/4 Sec (Ø) or 2 Sec (1)
Set up Internal Program Values and Switches to Permit Cycling in the Simulated - Incremented Time Mode
Set up FRAMESIZE
Set C/S DUMSECTTG = Elected Simulated Time to Go Minus Three Times Elected Time Increment
D1

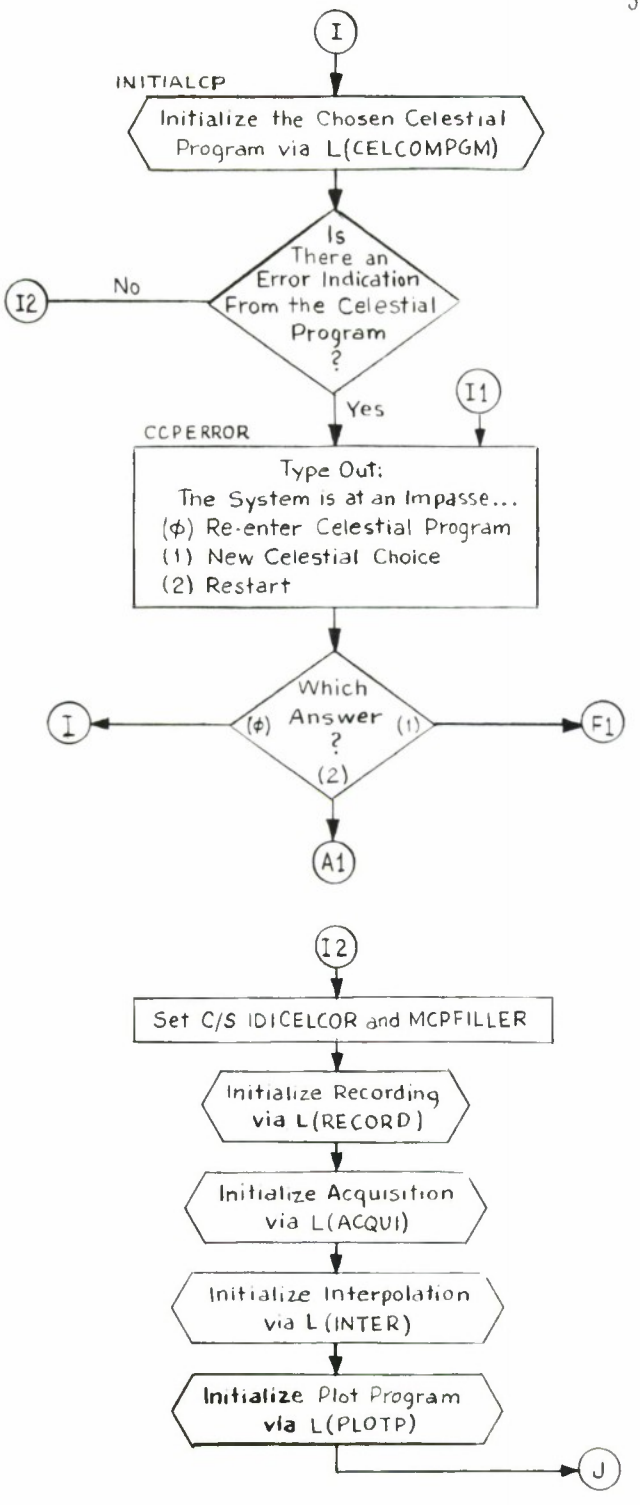

F
STANDSTILL
Set System Mode to High Speed = 1/4 Second W(RECORDSIZE)
Set Time Increment to GMT to Zero (FRAMESIZE)
Type Out: Initial Choice of GMT (HHMMSS)
Set up Internal Program Values and Switches to Permit Cycling in the Simulation - Stationary Time Mode
D1
F1
Type Out:
BELT (1) SAT (2) AZ-EL (3) SUN (4)
STARS(5) PLANETS (6) MOON (7) RADEC (8)
Is Requested Celestial Program in Core ?
Yes
G
No
Magnetic Tape Search
T
G

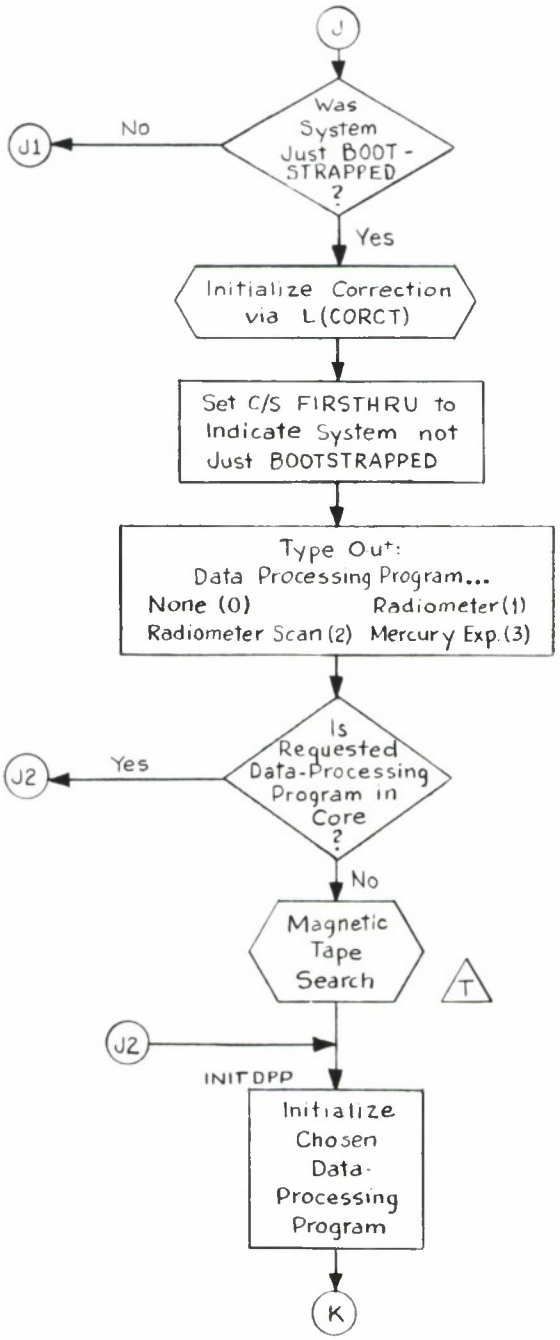

G
Set up C/S SYSTAT 2
Initialize Coordinate Conversion via L(COCON)
Was System Just BOOT-STRAPPED ?
No
Yes
Initialize Right Ascension Declination Display via L(RDXXX)
GOTOWF
Initialize Westford Intersite Coupling via L(WFORD)
Is System in Real Time Mode ?
H
Yes
No
Set C/S BLASTOFF Equal to Time to Go in C/S DUMSECTTG (Elected Time to Go Minus Three Time Increments)
Set the Following C/S Equal to the Elected Time to Go: TRUETIME, CEL-TIME, SCELTIME, CONVERTIME, and SRADTIME
I

H

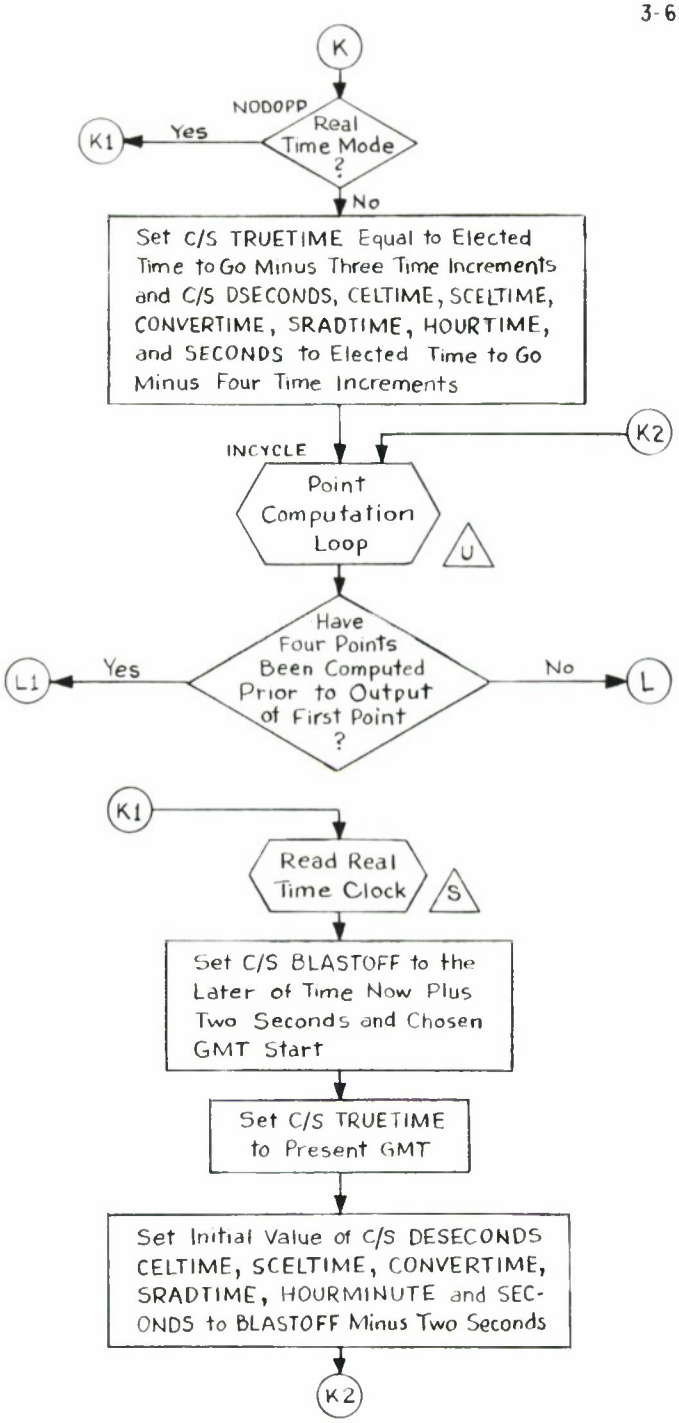
3-62-4559

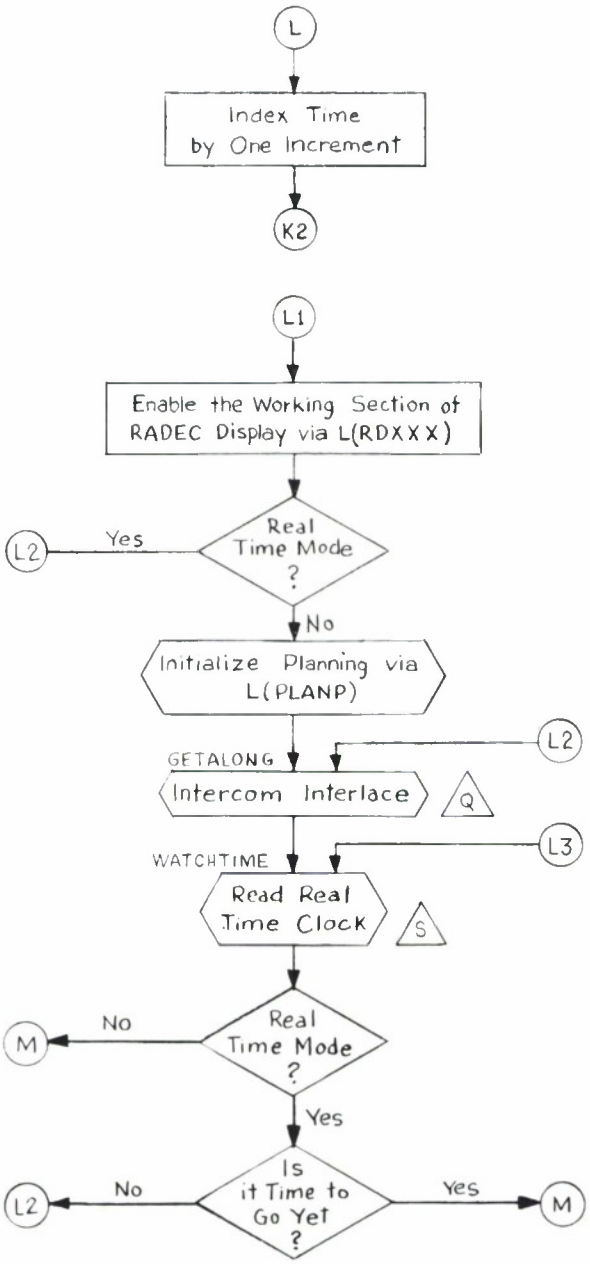

H
Read Real Time Clock
S
From C/S HOURREG and MINREG, Compute Chosen Time to Go
Compare the Chosen Time to Go with the Present Real Time Plus Two Seconds
Set up C/S Timing Registers: BLASTOFF, TRUETIME, CELTIME, SCELTIME, CONVERTIME, and SRADTIME to the Greater (Later) of These Two Times
I


I
INITIALCP
Initialize the Chosen Celestial Program via L(CELCOMPGM)
Is There an Error Indication From the Celestial Program ?
No
I2
Yes
I1
CCPERROR
Type Out:
The System is at an Impasse...
(ϕ) Re-enter Celestial Program
(1) New Celestial Choice
(2) Restart
Which Answer ?
(ϕ)
(1)
(2)
I
F1
A1
I2
Set C/S IDICELCOR and MCPFILLER
Initialize Recording via L(RECORD)
Initialize Acquisition via L(ACQUI)
Initialize Interpolation via L(INTER)
Initialize Plot Program via L(PLOTP)
J


J
Was System Just BOOT-STRAPPED ?
No
J1
Yes
Initialize Correction via L(CORCT)
Set C/S FIRSTHRU to Indicate System not Just BOOTSTRAPPED
Type Out:
Data Processing Program...
None (0)
Radiometer (1)
Radiometer Scan (2)
Mercury Exp. (3)
Is Requested Data-Processing Program in Core ?
Yes
J2
No
Magnetic Tape Search
T
J2
INIT DPP
Initialize Chosen Data-Processing Program
K

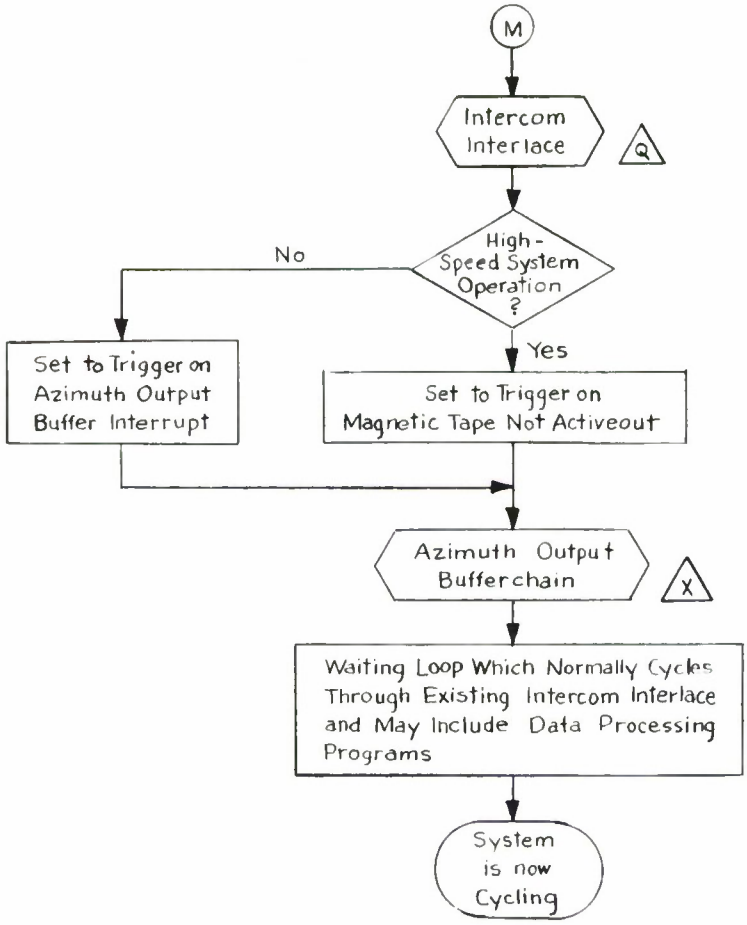
K


K
NODOPP
Real Time Mode ?
Yes
K1
No
Set C/S TRUETIME Equal to Elected Time to Go Minus Three Time Increments and C/S DSECONDS, CELTIME, SCELTIME, CONVERTIME, SRADTIME, HOURTIME, and SECONDS to Elected Time to Go Minus Four Time Increments
K2
INCYCLE
Point Computation Loop
U
Have Four Points Been Computed Prior to Output of First Point ?
Yes
L1
No
L
K1
Read Real Time Clock
S
Set C/S BLASTOFF to the Later of Time Now Plus Two Seconds and Chosen GMT Start
Set C/S TRUETIME to Present GMT
Set Initial Value of C/S DESECONDS CELTIME, SCELTIME, CONVERTIME, SRADTIME, HOURMINUTE and SECONDS to BLASTOFF Minus Two Seconds
K2


L
Index Time by One Increment
K2
L1
Enable the Working Section of RADEC Display via L(RDXXX)
Real Time Mode ?
Yes
L2
No
Initialize Planning via L(PLANP)
GETALONG
L2
Intercom Interface
Q
WATCHTIME
L3
Read Real Time Clock
S
Real Time Mode ?
No
M
Yes
Is it Time to Go Yet ?
No
L2
Yes
M

M

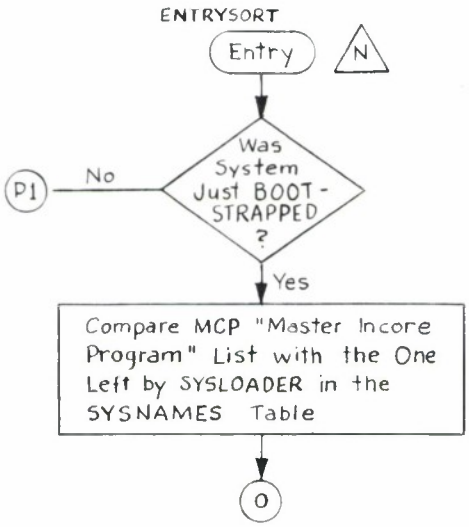
3-62-4564

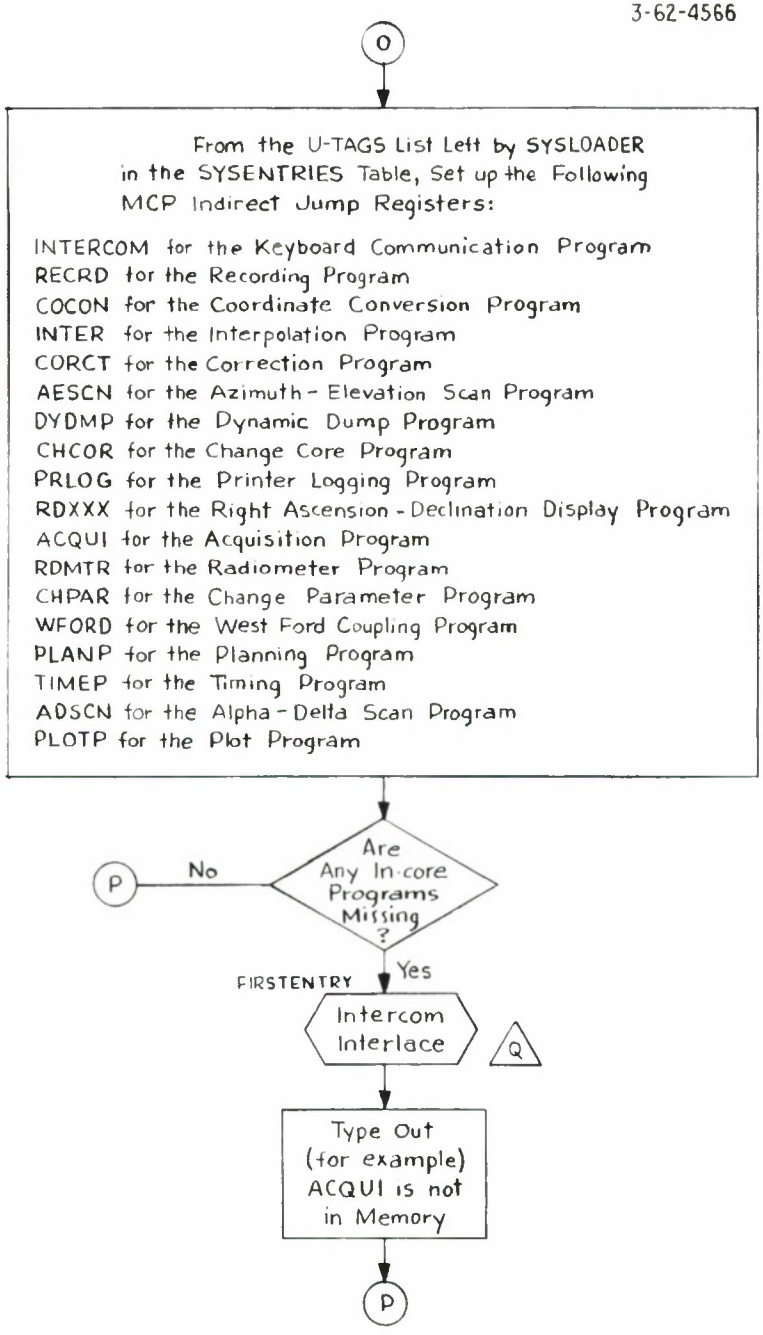

M
Intercom Interlace
Q
High-Speed System Operation ?
No
Yes
Set to Trigger on Azimuth Output Buffer Interrupt
Set to Trigger on Magnetic Tape Not Activeout
Azimuth Output Bufferchain
X
Waiting Loop Which Normally Cycles Through Existing Intercom Interlace and May Include Data Processing Programs
System is now Cycling

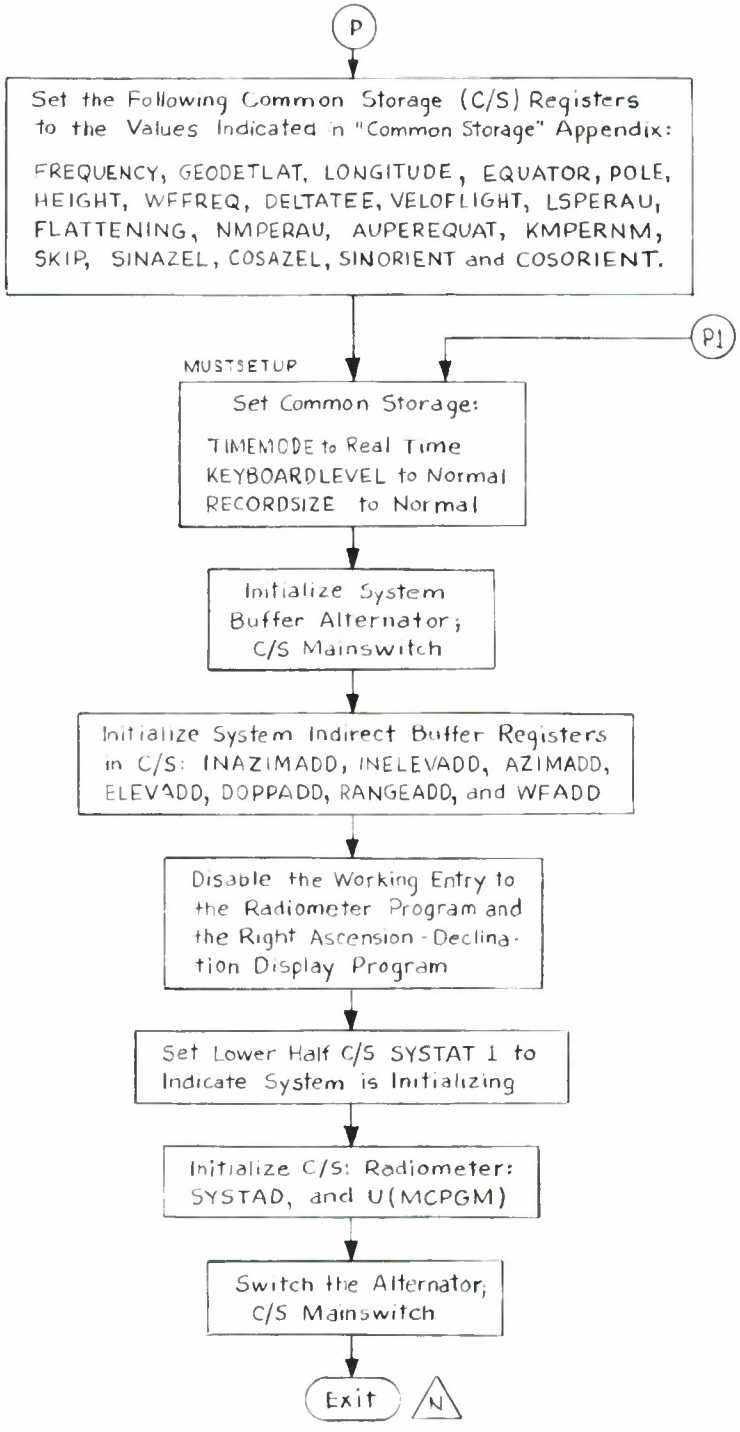
N

3-62-4565

SYSTEM SET UP SUBROUTINE



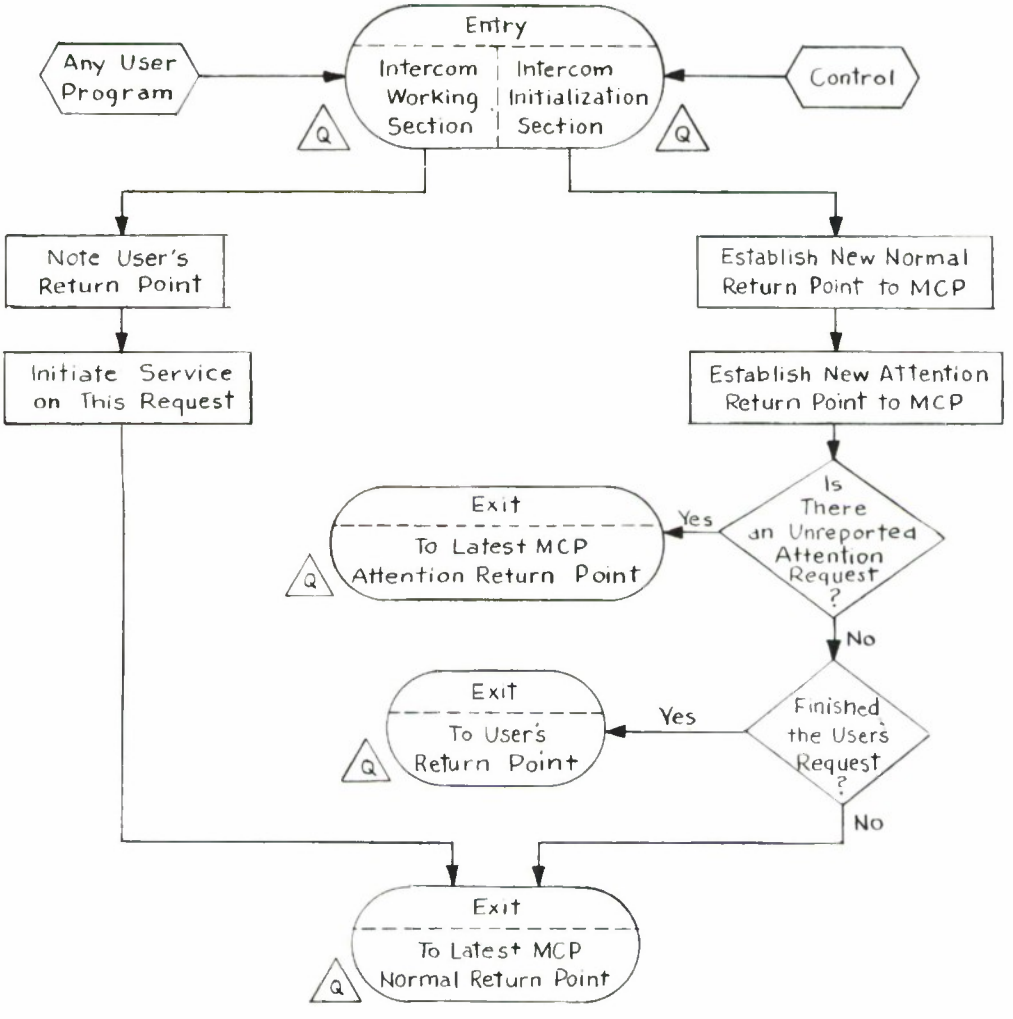

O
From the U-TAGS List Left by SYSLOADER in the SYSENTRIES Table, Set up the Following MCP Indirect Jump Registers:
INTERCOM for the Keyboard Communication Program
RECRD for the Recording Program
COCON for the Coordinate Conversion Program
INTER for the Interpolation Program
CORCT for the Correction Program
AESCN for the Azimuth - Elevation Scan Program
DYDMP for the Dynamic Dump Program
CHCOR for the Change Core Program
PRLOG for the Printer Logging Program
RDXXX for the Right Ascension - Declination Display Program
ACQUI for the Acquisition Program
RDMTR for the Radiometer Program
CHPAR for the Change Parameter Program
WFORD for the West Ford Coupling Program
PLANP for the Planning Program
TIMEP for the Timing Program
ADSCN for the Alpha - Delta Scan Program
PLOTP for the Plot Program
Are Any In-core Programs Missing ?
No
P
Yes
FIRSTENTRY
Intercom Interlace
Q
Type Out (for example) ACQUI is not in Memory
P


P
Set the Following Common Storage (C/S) Registers to the Values Indicated in "Common Storage" Appendix:
FREQUENCY, GEODETLAT, LONGITUDE, EQUATOR, POLE, HEIGHT, WFFREQ, DELTATEE, VELOFLIGHT, LSPERAU, FLATTENING, NMPERAU, AUPEREQUAT, KMPERNM, SKIP, SINAZEL, COSAZEL, SINORIENT and COSORIENT.
P1
MUSTSETUP
Set Common Storage:
TIMEMODE to Real Time
KEYBOARDLEVEL to Normal
RECORDSIZE to Normal
Initialize System Buffer Alternator; C/S Mainswitch
Initialize System Indirect Buffer Registers in C/S: INAZIMADD, INELEVADD, AZIMADD, ELEVADD, DOPPADD, RANGEADD, and WFADD
Disable the Working Entry to the Radiometer Program and the Right Ascension-Declination Display Program
Set Lower Half C/S SYSTAT 1 to Indicate System is Initializing
Initialize C/S: Radiometer: SYSTAD, and U(MCPGM)
Switch the Alternator; C/S Mainswitch
Exit
N

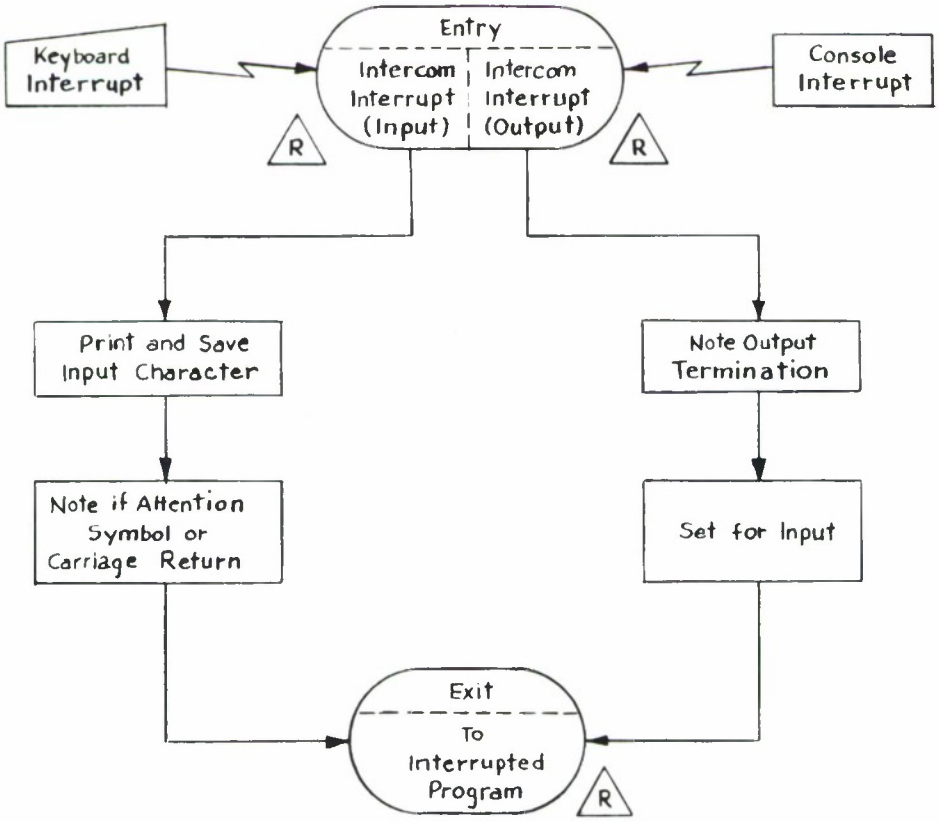
Q

3-62-4568

MCP INTERCOM INTERLACE



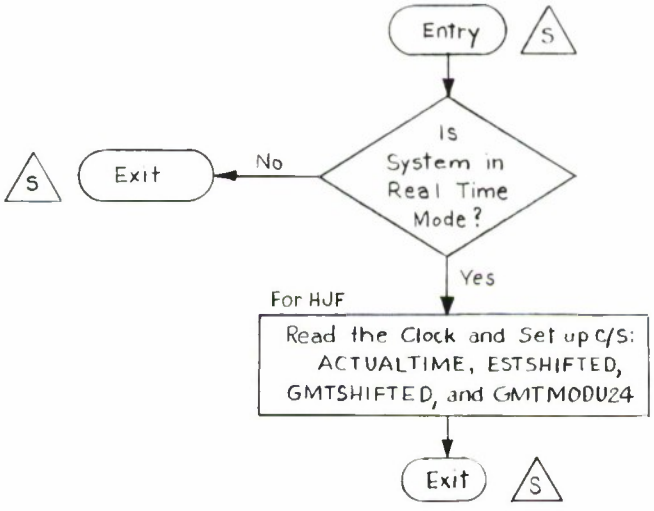
3-62-4569 R


Keyboard Interrupt
Entry
Intercom Interrupt (Input)
Intercom Interrupt (Output)
Console Interrupt
R
R
Print and Save Input Character
Note Output Termination
Note if Attention Symbol or Carriage Return
Set for Input
Exit
To Interrupted Program
R

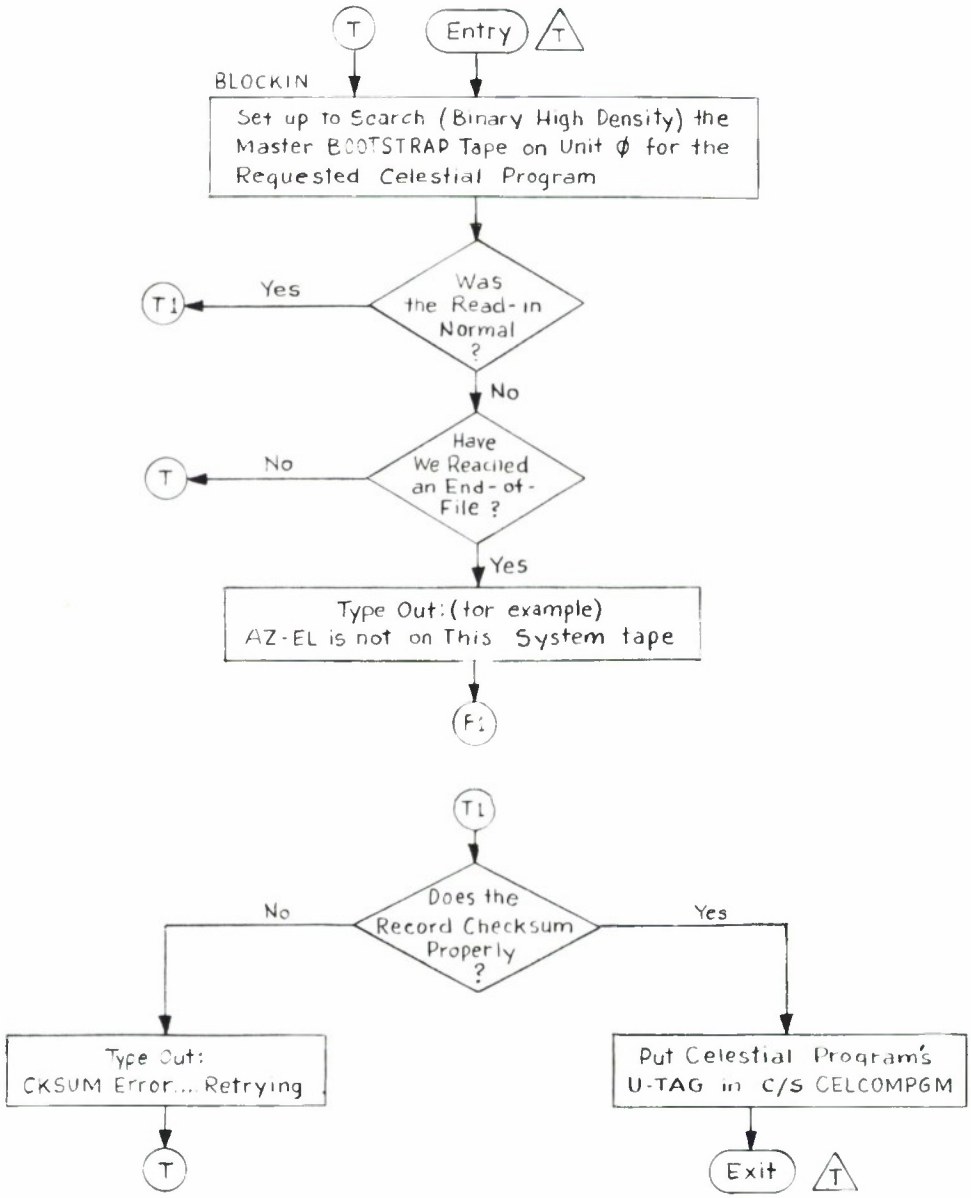
S

3-62-4570

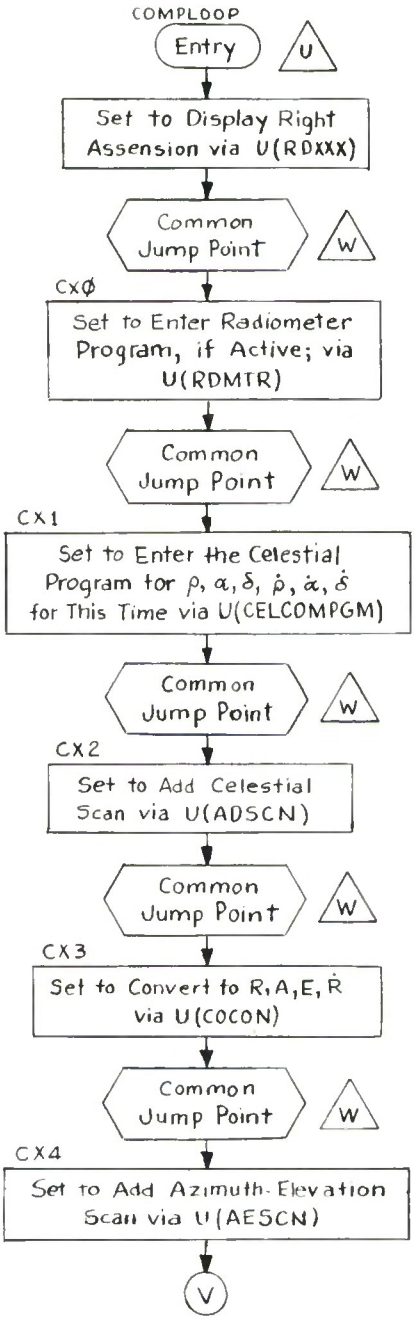
READ REAL TIME CLOCK SUBROUTINE



MAGNETIC TAPE SEARCH SUBROUTINE

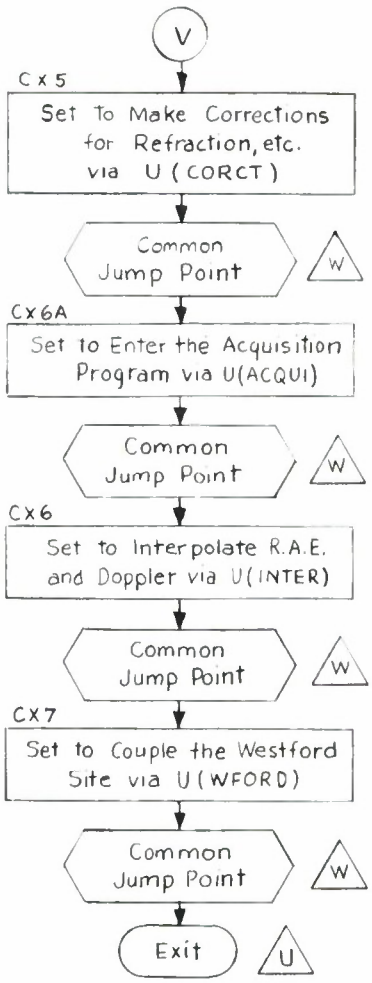


POINT COMPUTATION LOOP SUBROUTINE

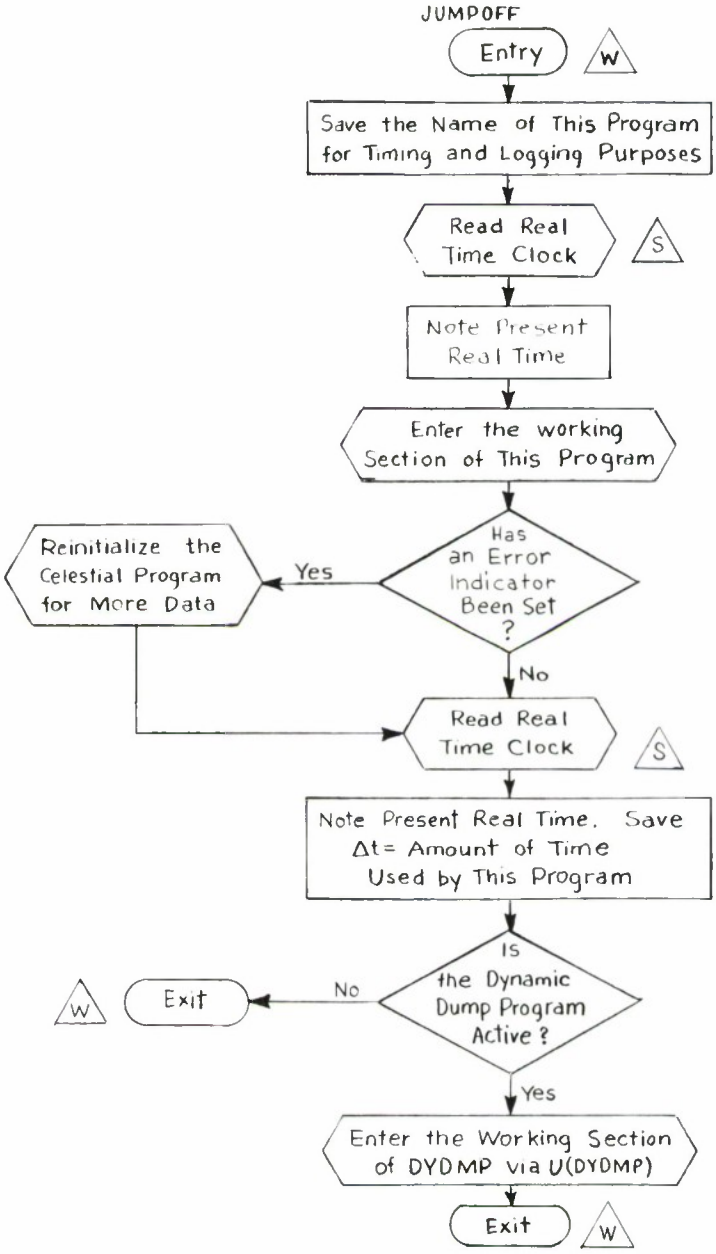


V

3-62-4573

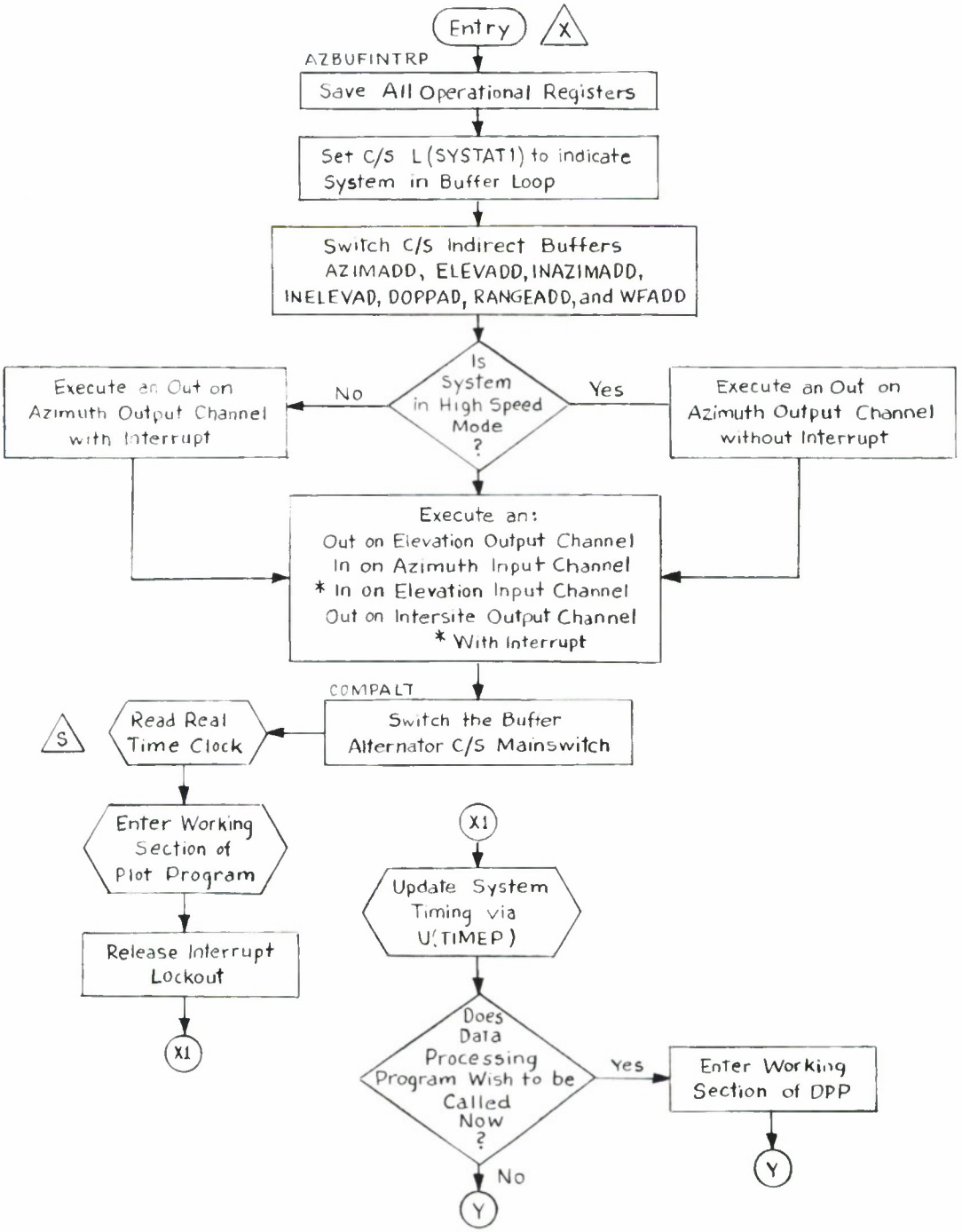

V
CX5
Set to Make Corrections for Refraction, etc. via U(CORCT)
Common Jump Point
W
CX6A
Set to Enter the Acquisition Program via U(ACQUI)
Common Jump Point
W
CX6
Set to Interpolate R.A.E. and Doppler via U(INTER)
Common Jump Point
W
CX7
Set to Couple the Westford Site via U(WFORD)
Common Jump Point
W
Exit
U

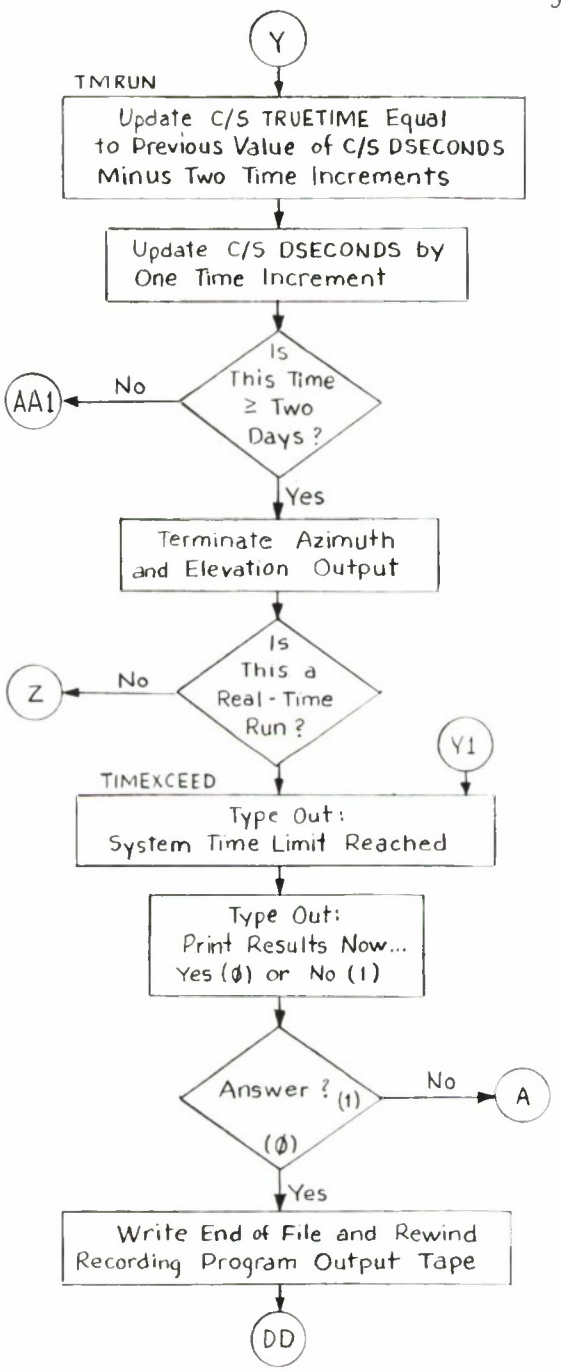
COMMON JUMP POINT SUBROUTINE

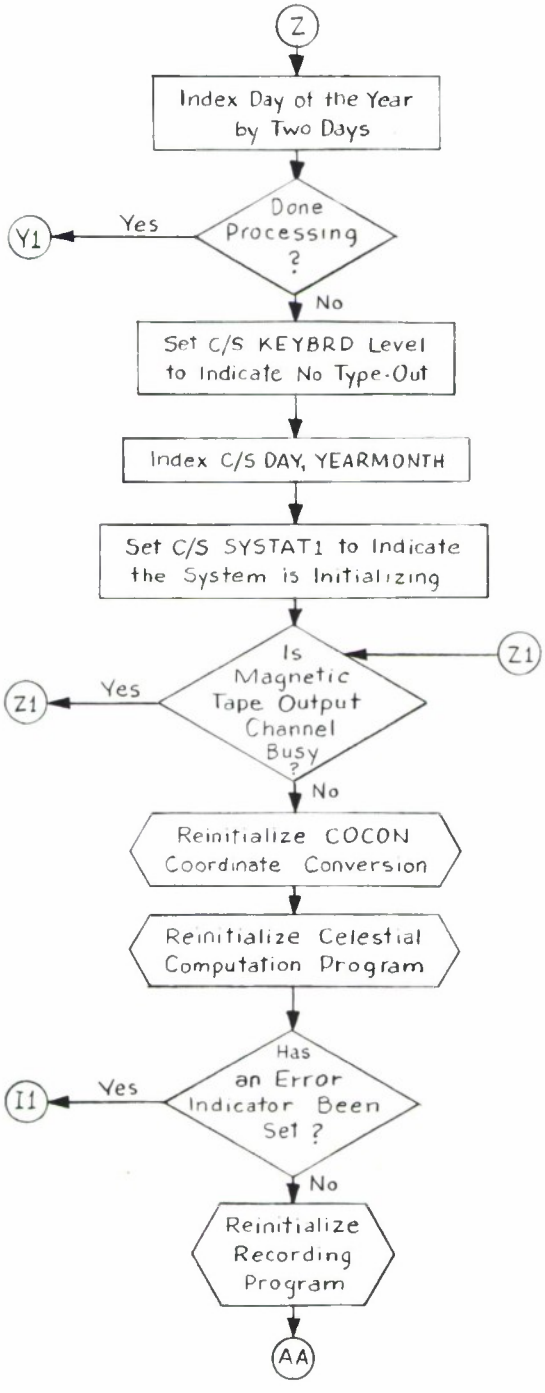


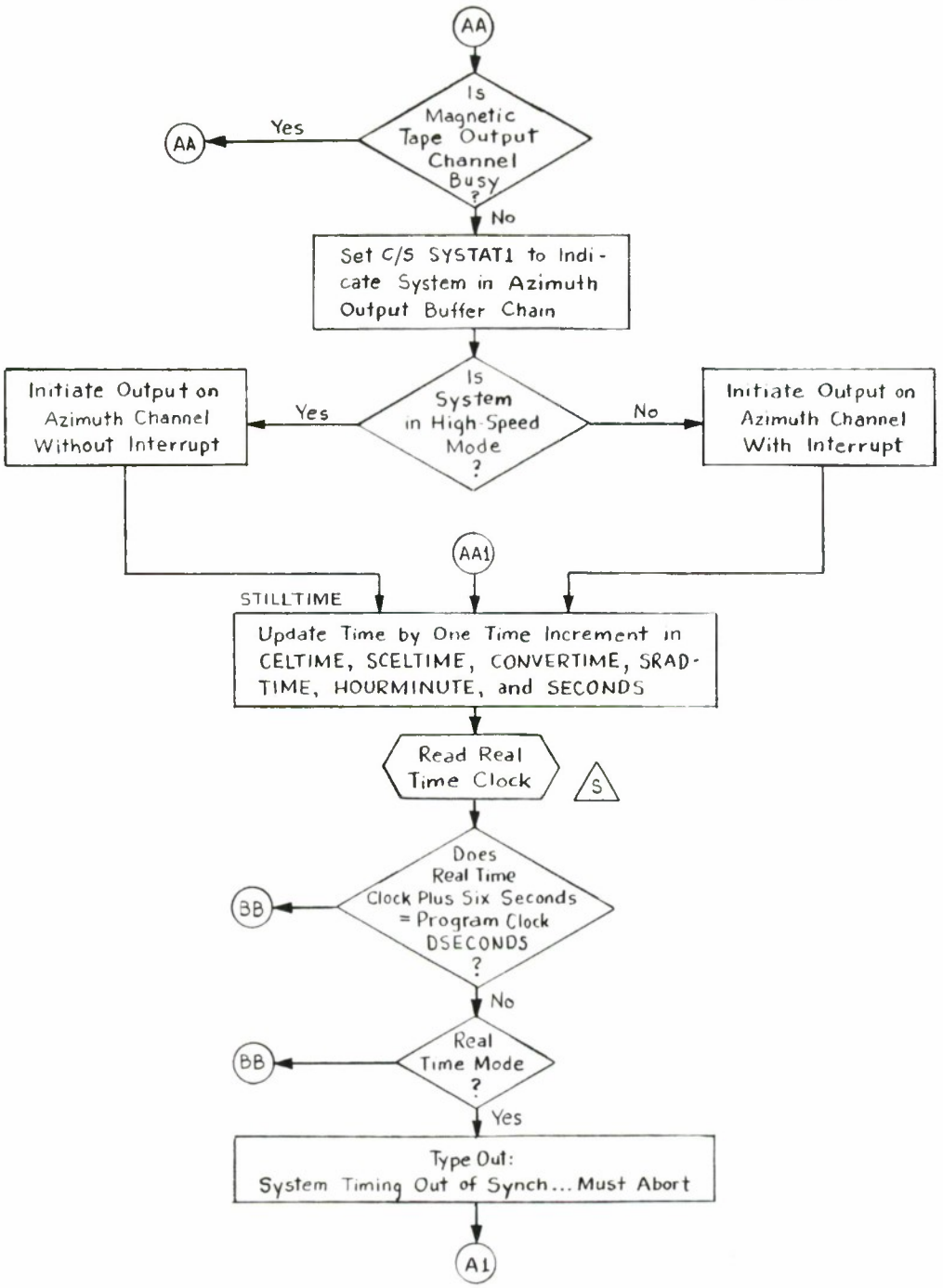
X

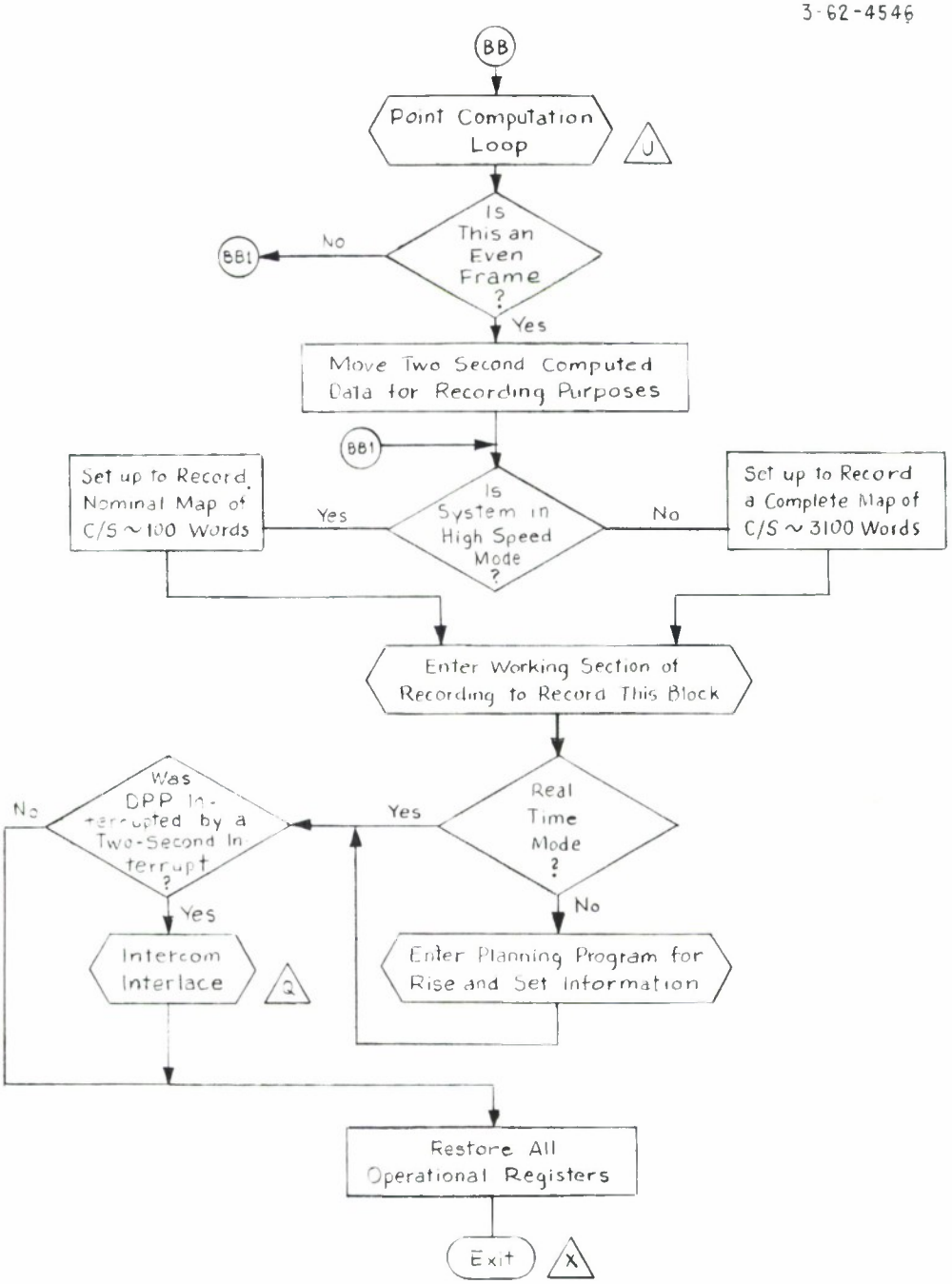
AZIMUTH OUTPUT BUFFER CHAIN SUBROUTINE



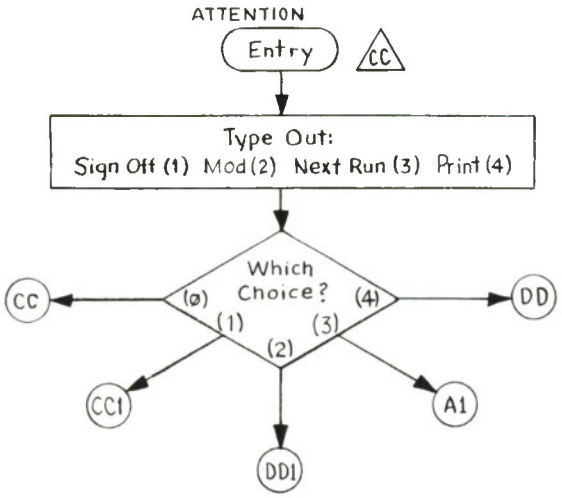

Y
TMRUN
Update C/S TRUETIME Equal to Previous Value of C/S DSECONDS Minus Two Time Increments
Update C/S DSECONDS by One Time Increment
Is This Time ≥ Two Days ?
No
AA1
Yes
Terminate Azimuth and Elevation Output
Is This a Real-Time Run ?
No
Z
Y1
TIMEXCEED
Type Out: System Time Limit Reached
Type Out: Print Results Now... Yes (Ø) or No (1)
Answer ? (1) (Ø)
No
A
Yes
Write End of File and Rewind Recording Program Output Tape
DD

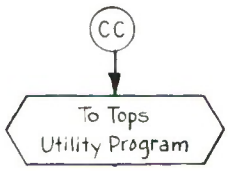

Z
Index Day of the Year by Two Days
Done Processing ?
Yes
Y1
No
Set C/S KEYBRD Level to Indicate No Type-Out
Index C/S DAY, YEARMONTH
Set C/S SYSTAT1 to Indicate the System is Initializing
Z1
Is Magnetic Tape Output Channel Busy ?
Yes
Z1
No
Reinitialize COCON Coordinate Conversion
Reinitialize Celestial Computation Program
Has an Error Indicator Been Set ?
Yes
I1
No
Reinitialize Recording Program
AA

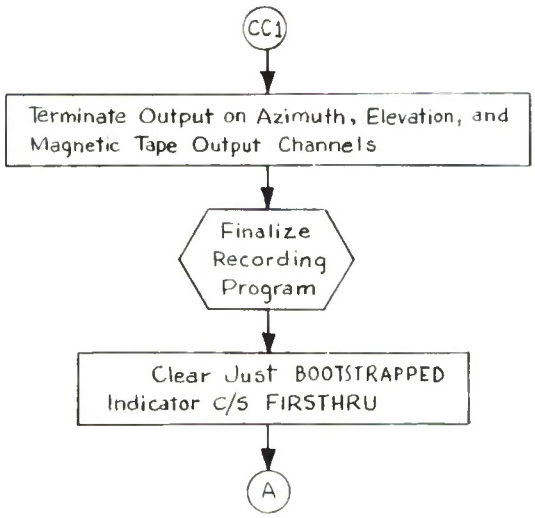

AA
Is Magnetic Tape Output Channel Busy ?
Yes
AA
No
Set C/S SYSTAT1 to Indicate System in Azimuth Output Buffer Chain
Is System in High-Speed Mode ?
Yes
Initiate Output on Azimuth Channel Without Interrupt
No
Initiate Output on Azimuth Channel With Interrupt
AA1
STILLTIME
Update Time by One Time Increment in CELTIME, SCELTIME, CONVERTIME, SRADTIME, HOURMINUTE, and SECONDS
Read Real Time Clock
S
Does Real Time Clock Plus Six Seconds = Program Clock DSECONDS ?
BB
No
Real Time Mode ?
BB
Yes
Type Out: System Timing Out of Synch... Must Abort
A1


BB
Point Computation Loop
J
Is This an Even Frame ?
No
BB1
Yes
Move Two Second Computed Data for Recording Purposes
BB1
Set up to Record Nominal Map of C/S ~ 100 Words
Yes
Is System in High Speed Mode ?
No
Set up to Record a Complete Map of C/S ~ 3100 Words
Enter Working Section of Recording to Record This Block
Was DPP Interrupted by a Two-Second Interrupt ?
No
Yes
Real Time Mode ?
Yes
No
Intercom Interlace
Q
Enter Planning Program for Rise and Set Information
Restore All Operational Registers
Exit
X

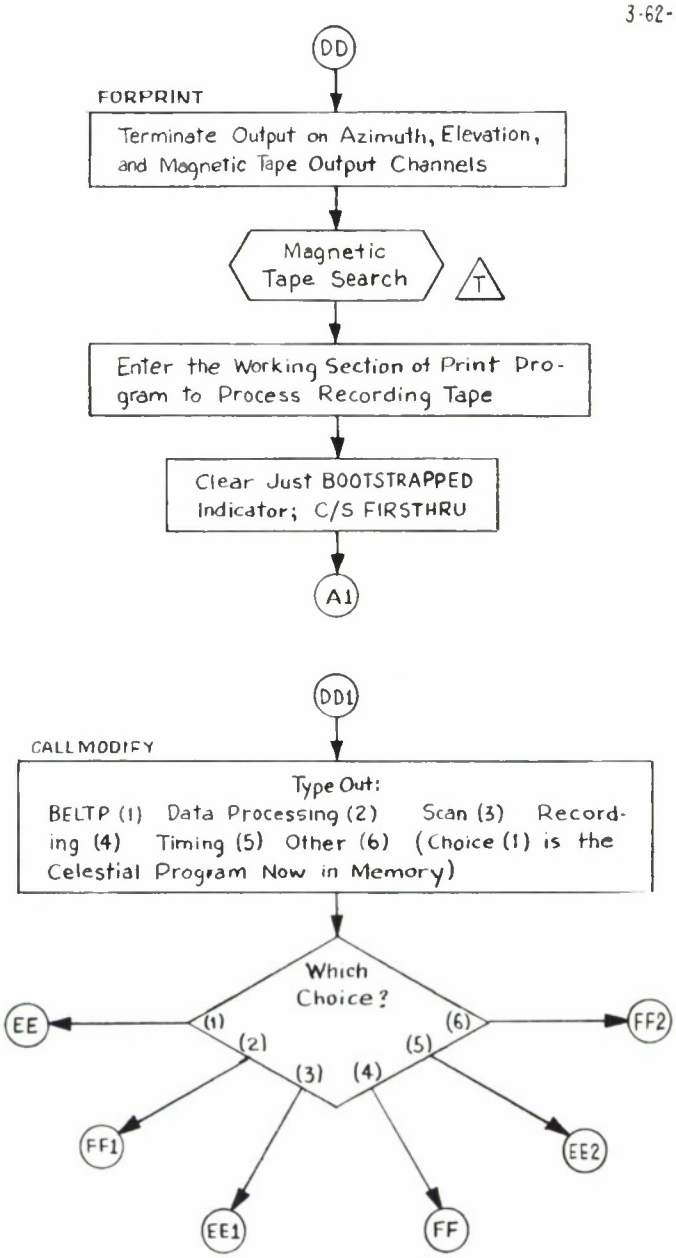
ATTENTION PROCESSING SUBROUTINE

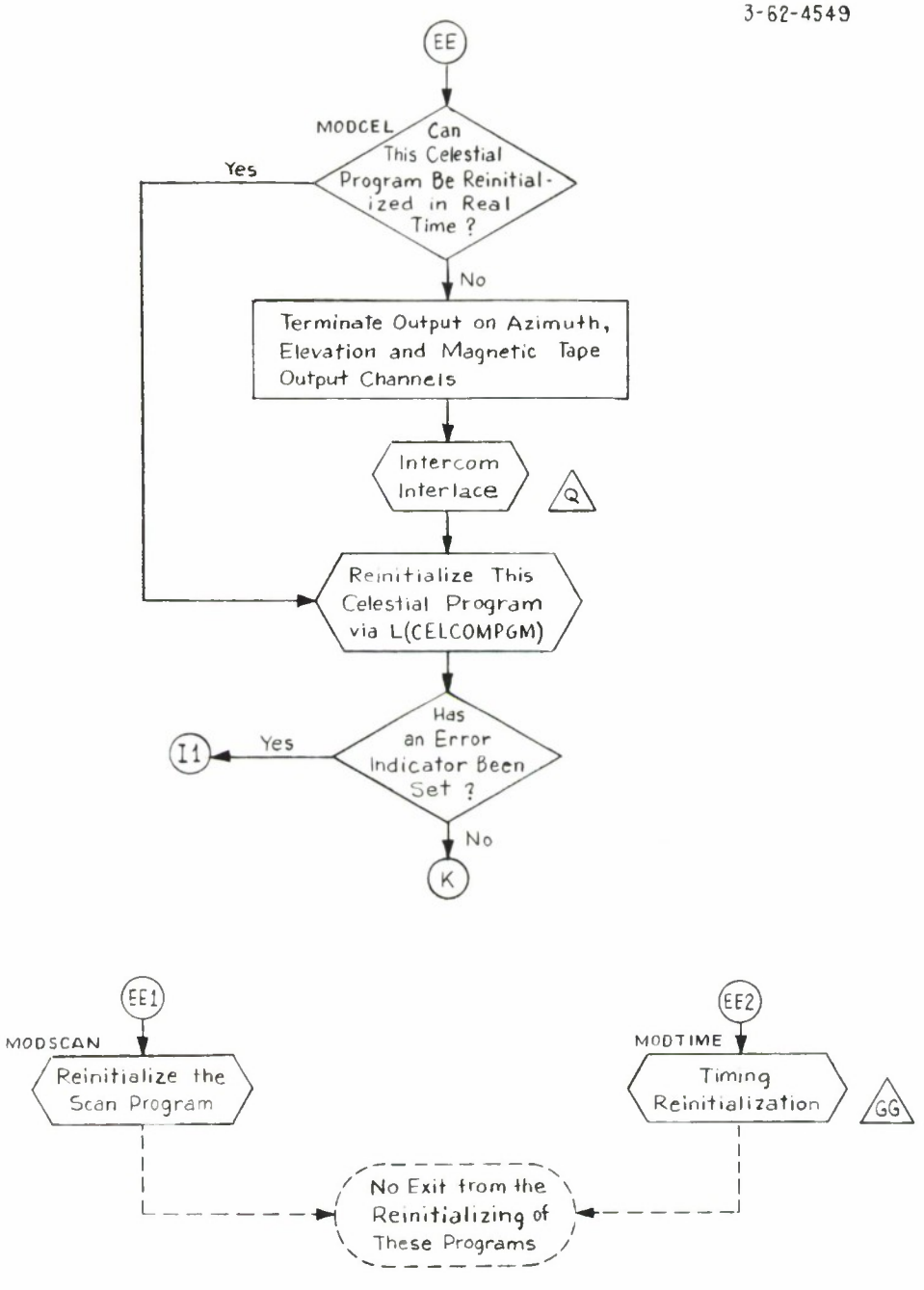


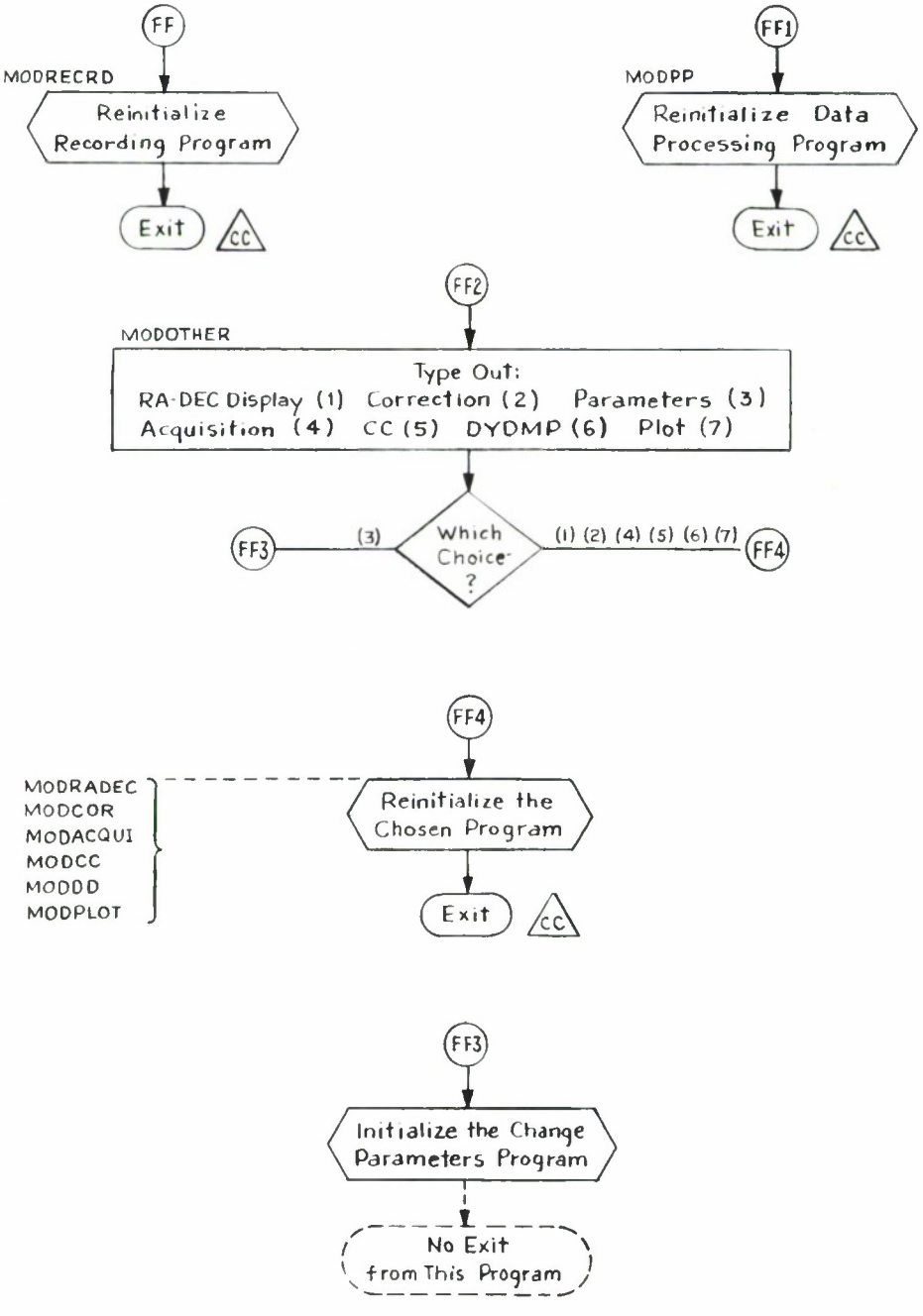




3-62-4548

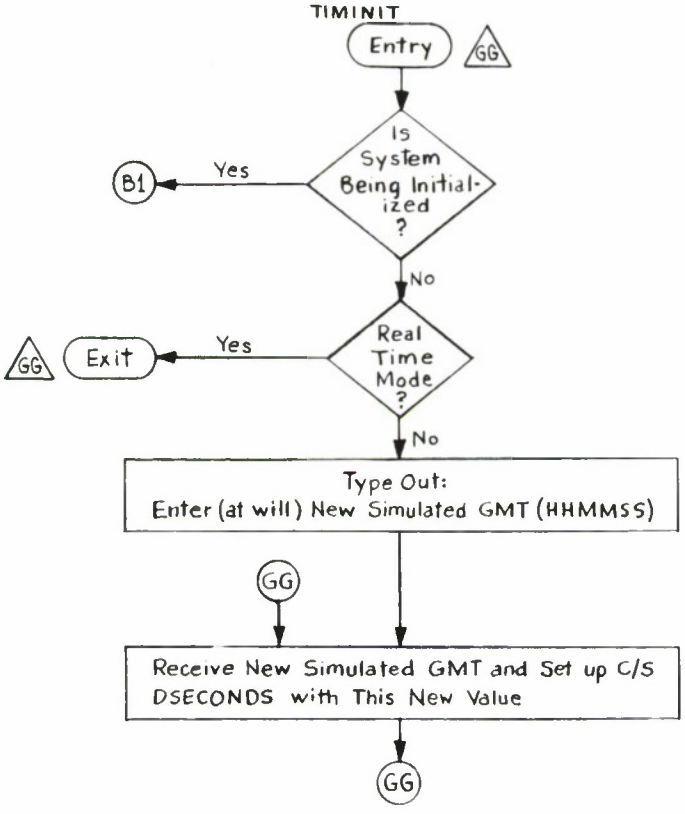

DD
FORPRINT
Terminate Output on Azimuth, Elevation, and Magnetic Tape Output Channels
Magnetic Tape Search
T
Enter the Working Section of Print Program to Process Recording Tape
Clear Just BOOTSTRAPPED Indicator; C/S FIRSTHRU
A1
DD1
CALLMODIFY
Type Out:
BELTP (1) Data Processing (2) Scan (3) Recording (4) Timing (5) Other (6) (Choice (1) is the Celestial Program Now in Memory)
Which Choice?
(1)
(2)
(3)
(4)
(5)
(6)
EE
FF2
FF1
EE2
EE1
FF


EE
MODCEL
Can This Celestial Program Be Reinitial-ized in Real Time ?
Yes
No
Terminate Output on Azimuth, Elevation and Magnetic Tape Output Channels
Intercom Interface
Q
Reinitialize This Celestial Program via L(CELCOMPGM)
Has an Error Indicator Been Set ?
Yes
I1
No
K
EE1
MODSCAN
Reinitialize the Scan Program
EE2
MODTIME
Timing Reinitialization
GG
No Exit from the Reinitializing of These Programs


FF
MODRECRD
Reinitialize Recording Program
Exit
CC
FF1
MODPP
Reinitialize Data Processing Program
Exit
CC
FF2
MODOTHER
Type Out:
RA-DEC Display (1) Correction (2) Parameters (3)
Acquisition (4) CC (5) DYDMP (6) Plot (7)
Which Choice ?
(3)
FF3
(1) (2) (4) (5) (6) (7)
FF4
FF4
MODRADEC
MODCOR
MODACQUI
MODCC
MODDD
MODPLOT
Reinitialize the Chosen Program
Exit
CC
FF3
Initialize the Change Parameters Program
No Exit from This Program

3-62-4551 GG

TIMING REINITIALIZATION SUBROUTINE



APPENDIX H
Listing of Master Control and Timing Programs

SPURT OUTPUT NO. 210
MCP J00*6/1/65

```
CARDS   LI IC LABEL       TA STATEMENT                          LOC    F JKB Y      NOTES

.       C00CC MCP             PROGRAM   J0D*6/1/65
.       C0C01                 COMMENT   MAR.10*65                                 VERSION FOR DATA PROCESSING PR
                                                                                   OGRAMS
.       C0002                 COMMENT   3/2/65                                    VERSION 1) FOR PLOT 2) FOR DOP
                                                                                   PLER TO H.S.
.       C0003                 COMMENT   3)                                        FOR PREOUTS TO ALL SITES 4) RE
                                                                                   AD CLOCK ALL MODES
.       C0004                 COMMENT   HAYSTACK                                  TO MILLSTONE COUPLING
.       C0005                 COMMENT   TIMING                                    IN TIMEP (EXCEPT KICKOFF)
.       C00C6 TAPE            MEANS     C15
.       C0007 INTERSITE       MEANS     C14
.       C0010 AZCHAN          MEANS     C13
.       C0011 ELCHAN          MEANS     C12
.       C0012 DOPPCHAN        MEANS     C11
.       C0013 RANGECHAN       MEANS     C10
.       C0014 RTCLOCK         MEANS     C7
.       C0015 SPARE1          MEANS     C6
.       C0C16 DATACHAN        MEANS     C5
.       C0C17 PAPERTAPE       MEANS     C4
.       C002C HSPRINTER       MEANS     C3
.       C0021 CONSOLE         MEANS     C2
.       C0022 SPARE2          MEANS     C1
.       C0023 FX2             MEANS     C0
.       C0024 AOOROIFF        EQUALS    MCPFILLER-IO1CELCOR
.       C0025 NMOVES          EQUALS    1000
.       C0026 NWORDS          EQUALS    4990
.       C0027 ANTMONITOR      EQUALS    73                                        AZ OUTPUT MONITOR INTERRUPT RE
                                                                                   GISTER
.       C003C MCP             U-TAG     MCP+2*MCP+2             00000  00002 00002
.       C0031                 FD    1*MCPGM                     00001  22102 51422
.       C0032 PRESORT         SIL                               00002  64000 00000
.       C0033                 PUT   W(AOBI)*W(ANTMONITOR)       00003  10030 02426  SET AZ O/P MONITOR INTERRUPT R
                                                                                   EG.
                                                                00004  14030 00073
.       C0C34                 ENT   A*60000                     00005  11000 60000  SET EXTERNAL INTERRUPT REGISTE
                                                                                   RS TO RIL
.       C0035                 RPT   15D*ADV                     00006  70100 00017
.       C0036                 STR   A*U(20)                     00007  15020 00020
.       C0C37                 RIL                               00010  60000 00000
.       C004C                 RJP   ENTRYSORT                   00011  65000 01056
.       C0041                 PUT   W(JPANSREW1)*W(35)          00012  10030 01423
                                                                00013  14030 00035
.       C0042                 EX-FCT    TAPE*3010000002         00014  13570 04150
.       C0043                 JP    $                           00015  61000 00015
.       C0044 ANSREW1         STR   TAPE*W(TEMP)                00016  17570 04126
.       C0045                 STR   80*CPL(SYSTAT1)             00017  16050 53313
.       C0046                 CL    W(AZBUFSWDPP)               00020  16030 02063
.       C0047                 TERM  AZCHAN*OUTPUT               00021  67540 00000
.       C005C                 TERM  ELCHAN*OUTPUT               00022  67500 00000
.       C0051                 TERM  TAPE*OUTPUT                 00023  67640 00000
.       C0052                 TERM  DATACHAN*INPUT              00024  66240 00000
.       C0053 STOPSCAN        ENT   A*L(ADSCN)*ANOT             00025  11510 63416  TERMINATE SCAN IN INTIALIZATIO
                                                                                   N
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CARDS    LI (D LABEL       TA STATEMENT                                LOC    F JKB Y      NOTES

   .     C0054               JP   $+2                                00026  61000 00030
   .     C0055               RJP  A                                  00027  65070 00000  AC NOT ZERO FINALIZE
   .     C0056               PUT  W(OYOMP)*W(SAVEDYDMP)              00030  10030 53421
                                                                     00031  14030 02603
   .     C0057               PUT  12000*U(INSERT)                    00032  10000 12000
                                                                     00033  14020 00037
   .     C0060               CL   U(OYOMP)                           00034  16020 53421
   .     C0061 FIRSTENTRY    RJP  L((NTERCOM)                        00035  65010 53426  INITIALIZE KEYBOARD ROUTINE
   .     C0062               RJP  ATTENTION                          00036  65000 00043
   .     C0063 (NSERT        NO-OP                                   00037  12000 00000
   .     C0064               PUT  W(NEWINSTR)*W(INSERT)              00040  10030 02427  JP  FIRSTENTRY
                                                                     00041  14030 00037
   .     C0065               JP   CALLNEWRUN                         00042  61000 00332
   .     C0066 ATTENTION     ENTRY                                   00043  61000 00000
   .     C0067               PUT  2*L(ANS1)                          00044  10000 00002
                                                                     00045  14010 02324
   .     C007C               RJP  U(INTERCOM)                        00046  65020 53426
   .     C0071               U-TAG     ATTMSG*REPLY1                 00047  02305 02320  ASK FOR CHOICE
   .     C0072               ENT  B1*L(ANS1)                         00050  12110 02324
   .     C0073               JP   L(WHICHANS+B1)                     00051  61011 00052
   .     C0074 WHICHANS      O    137                                00052  00000 00137  TO TOPS (A SECRET)
   .     C0075               U    CALLSTOP                           00053  00000 00113  STOP THE SYSTEM
   .     C0076               O    CALLMODFY                          00054  00000 00127  MODIFY A PARAMETER MAYBE IN RE
                                                                                          AL TIME
   .     C0077               O    PRESORT                            00055  00000 00002
   .     C0100               O    FORPRINT                           00056  00000 00057
   .     C0101 FORPRINT      PUT  61000*U(CANMOVE)                   00057  10000 61000  STOP CYCLING
                                                                     00060  14020 00773
   .     C0102               STR  BU*CPL(SYSTAT1)                    00061  16050 53313
   .     C0103               PUT  12000*U(NEWINTLACE)                00062  10000 12000
                                                                     00063  14020 00067
   .     C0104               RJP  L(INTERCOM)                        00064  65010 53426
   .     C0105               RJP  ATTENTION                          00065  65000 00043
   .     C0106               NO-OP                                   00066  12000 00000
   .     C0107 NEWINTLACE    JP   $-3                                00067  61000 00064
   .     C011C               PUT  61000*U(NEWINTLACE)                00070  10000 61000
                                                                     00071  14020 00067
   .     C0111               TERM DATACHAN*INPUT                     00072  66240 00000
   .     C0112               EX-FCT    DATACHAN*2440404040           00073  13270 04151  STOP CHAN 5 RECORDER
   .     C0113               TERM AZCHAN*OUTPUT                      00074  67540 00000
   .     C0114               STR  BU*CPL(SYSTAT1)                    00075  16050 53313  FOR PLOT PGM  STOP PLOTTING
   .     C0115               TERM ELCHAN*OUTPUT                      00076  67500 00000
   .     C0116               TERM TAPE*OUTPUT                        00077  67640 00000
   .     C0117               TERM DATACHAN*(NPUT                     00100  66240 00000
   .     C012C               PUT  CELCUMPGM*L(WHCHCLSPGM)            00101  10000 53424  SET BLOCKIN FOR CELESTIAL PGM
                                                                     00102  14010 01377
   .     C0121               PUT  ATTENTION+1*L(ERRORRET)            00103  10000 00044  SET BLOCKIN ERROR RETURN
                                                                     00104  14010 01414
   .     C0122               PUT  W(PR(NTKEY)*W(SEARCHKEY)           00105  10030 02627
                                                                     00106  14030 02405
   .     C0123               RJP  BLOCKIN                            00107  65000 01276
   .     C0124               RJP  U(CELCOMPGM)                       00110  65020 53424
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CARDS	LI (C	LABEL	TA	STATEMENT	LOC	F JKB Y	NOTES
.	C0125		CL	W(FIRSTHRU)	00111	16030 53153	
.	C0126		JP	PRESORT	00112	61000 00002	
.	C0127	CALLSTOP	TERM	AZCHAN*OUTPUT	00113	67540 00000	
.	C0130		TERM	ELCHAN*OUTPUT	00114	67500 00000	
.	C0131		TERM	TAPE*OUTPUT	00115	67640 00000	
.	C0132		TERM	DATACHAN*INPUT	00116	66240 00000	
.	C0133		ENT	A*L(RECRD)*ANOT	00117	11510 53415	
.	C0134		JP	$+2	00120	61000 00122	
.	C0135		RJP	A*	00121	65070 00000	TERMINATE RECORDING
.	C0136		CL	W(FIRSTHRU)	00122	16030 53153	
.	C0137		STR	BD*CPW(TTYSTATUS)	00123	16070 53111	YES
.	C0140		JP	$+2*KEY3	00124	61300 00126	TEST FOR WESTBORO CONTROL
.	C0141		CL	W(TTYSTATUS)	00125	16030 53111	NO
.	C0142		JP	PRESORT	00126	61000 00002	
.	C0143	CALLMODFY	RJP	U(INTERCOM)	00127	65020 53426	WHICH PROGRAM TO MODIFY
.	C0144		U-TAG	MODMSG1*MODANS1	00130	02432 02453	
.	C0145		ENT	B1*L(MODCHOICE1)	00131	12110 02457	1 THRU 4
.	C0146		JP	L(WHICHMOD1+B1)	00132	61011 00133	
.	C0147	WHICHMOD1	0	CALLMODFY	00133	00000 00127	WISE GUY
.	C0150		0	MODCEL	00134	00000 00170	
.	C0151		0	MODPP	00135	00000 00164	
.	C0152		0	MODSCAN	00136	00000 00142	
.	C0153		0	MODRECRD	00137	00000 00153	
.	C0154		0	MODTIME	00140	00000 00160	
.	C0155		0	MODOTHER	00141	00000 00256	
.	C0156	MODSCAN	ENT	A*L(AOSCN)*ANOT	00142	11510 53416	
.	C0157		JP	WLRETURN	00143	61000 00325	RETURN TO NORMAL RET OF CURRENT INT/INTERLACE
.	C0160		CL	A*	00144	11000 00000	
.	C0161		RJP	L(AOSCN)	00145	65010 53416	
.	C0162		ENT	A*L(AESCN)*ANOT	00146	11510 53417	
.	C0163		JP	$+3	00147	61000 00152	
.	C0164		CL	A*	00150	11000 00000	
.	C0165		RJP	L(AESCN)	00151	65010 53417	
.	C0166		JP	WLRETURN	00152	61000 00325	RETURN TO NORMAL RET OF CURRENT INT/INTLACE
.	C0167	MODRECRD	ENT	A*L(RECRD)*ANOT	00153	11510 53415	REINITIALIZE RECORDING
.	C0170		JP	WLRETURN	00154	61000 00325	RETURN TO NORMAL RET OF CURRENT INT/INTLACE
.	C0171		CL	A*	00155	11000 00000	
.	C0172		RJP	L(RECRD)	00156	65010 53415	
.	C0173		JP	WLRETURN	00157	61000 00325	RETURN TO NORMAL RET OF CURRENT INT/INTLACE
.	C0174	MODTIME	ENT	A*L(TIMEP)*ANOT	00160	11510 53435	
.	C0175		JP	WLRETURN	00161	61000 00325	RETURN TO NORMAL RET OF CURRENT INT/INTLACE
.	C0176		RJP	L(TIMEP)	00162	65010 53435	
.	C0177		JP	WLRETURN	00163	61000 00325	RETURN TO NORMAL RET OF CURRENT INT/INTLACE
.	C0200	MODPP	ENT	A*L(DATANALYZE)*ANOT	00164	11510 53425	
.	C0201		JP	WLRETURN	00165	61000 00325	RETURN TO NORMAL RET OF CURRENT INT/INTLACE
.	C0202		RJP	A	00166	65070 00000	

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CARDS    LI ID LABEL      TA STATEMENT                                LOC    F JKB Y      NOTES

   .     C0203               JP   WLRETURN                          00167  61000 00325  RETURN TO NORMAL RET OF CURREN
                                                                                         T INT/INTLACE
   .     C0204 MODCEL        ENT  B1*L(CELCHOICE)                   00170  12110 02371  IS R/T REINIT POSSIBLE
   .     C0205               ENT  A*W(RTREINIT-1+B1)*APOS           00171  11531 02511  POSITIVE = CAN DO
   .     C0206               JP   MUSTSTOP                          00172  61000 00200
   .     C0207               ENT  A*L(CELCOMPGM)*ANOT               00173  11510 53424
   .     C0210               RJP  CCPERROR                          00174  65000 01460
   .     C0211 MODCELPGM     RJP  L(CELCOMPGM)                      00175  65010 53424
   .     C0212               JP   MODCELPGM                         00176  61000 00175
   .     C0213               JP   WLRETURN                          00177  61000 00325  RETURN TO NORMAL RET OF CURREN
                                                                                         T INT/INTLACE
   .     C0214 MUSTSTOP      TERM AZCHAN*OUTPUT                     00200  67540 00000
   .     C0215               TERM ELCHAN*OUTPUT                     00201  67500 00000
   .     C0216               TERM TAPE*OUTPUT                       00202  67540 00000
   .     C0217               TERM DATACHAN*INPUT                    00203  66240 00000
   .     C0220               STR  B0*CPL(SYSTAT1)                   00204  16050 53313
   .     C0221               CL   W(AZBUFSWOPP)                     00205  16030 02063
   .     C0222               PUT  12000*U(RENEW)                    00206  10000 12000
                                                                    00207  14020 00213
   .     C0223 NEWLOOP       RJP  L(INTERCOM)                       00210  65010 53426
   .     C0224               RJP  ATTENTION                         00211  65000 00043
   .     C0225               NO-OP                                  00212  12000 00000
   .     C0226 RENEW         NO-OP                                  00213  12000 00000
   .     C0227               PUT  W(FORNEW)*W(RENEW)                00214  10030 04134
                                                                    00215  14030 00213
   .     C0230 CHECKNWDAY    RJP  READCLOCK                         00216  65000 01437
   .     C0231               ENT  A*W(PREVIOUSTM)                   00217  11030 53461
   .     C0232               PUT  W(GMTMODU24)*W(PREVIOUSTM)        00220  10030 53145
                                                                    00221  14030 53461
   .     C0233               SUB  A*W(GMTMODU24)*APOS               00222  21530 53145
   .     C0234               JP   NOXING                            00223  61000 00230
   .     C0235               RPL  Y+1*L(DAY)                        00224  36010 53150
   .     C0236               RPL  Y+1*U(DAY)                        00225  36020 53150
   .     C0237               RJP  U(INTERCOM)                       00226  65020 53426
   .     C0240               U-TAG     TELLXEQ*0                    00227  01356 00000
   .     C0241 NOXING        STR  B0*CPW(HOURREG)                   00230  16070 53151
   .     C0242               ENT  Q*W(GMTMODU24)                    00231  10030 53145
   .     C0243               CL   A*                                00232  11000 00000
   .     C0244               DIV  50000                             00233  23000 11610
   .     C0245               SUB  A*25000*ANEG                      00234  21700 04704
   .     C0246               ADD  Q*1                               00235  26000 00001
   .     C0247               STR  Q*A                               00236  14040 00000
   .     C025C               CL   Q*                                00237  10000 00000
   .     C0251               RSH  AQ*2                              00240  03000 00002
   .     C0252               DIV  864000                            00241  23030 04152
   .     C0253               STR  Q*W(CELTIME)                      00242  14030 53133
   .     C0254               STR  Q*W(CONVERTIME)                   00243  14030 53135
   .     C0255               RJP  U(COCON)                          00244  65020 53414
   .     C0256               STR  B0*CPW(KYBRDLEVEL)                00245  16070 53110
   .     C0257               CL   A*                                00246  11000 00000
   .     C026C               RJP  L(RECRD)                          00247  65010 53416
   .     C0261               CL   W(KYBRDLEVEL)                     00250  16030 53110
   .     C0262               ENT  A*L(CELCOMPGM)*ANOT               00251  11510 53424
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CARDS	LI	ID	LABEL	TA	STATEMENT	LOC	F JKB Y	NOTES
.	C0263			JP	$+3	00252	61000 00255	
.	C0264		REINITCP	RJP	L(CELCOMPGM)	00253	65010 53424	
.	C0265			RJP	CCPERROR	00254	65000 01460	
.	C0266			JP	SETTOGO	00255	61000 00573	
.	C0267		MODOTHER	RJP	U(INTERCOM)	00256	65020 53426	WANTS CC,DO,LOG, OR CORCT
.	C027C			U-TAG	MOOMSG2*MODANS2	00257	02460 02505	
.	C0271			ENT	B1*L(MOOCHOICE2)	00260	12110 02511	
.	C0272			JP	L(WHICHMOD2+B1)	00261	61011 00262	
.	C0273		WHICHMOD2	0	MODOTHER	00262	00000 00256	
.	C0274			0	MODRADEC	00263	00000 00272	
.	C0275			0	MODCOR	00264	00000 00306	
.	C0276			0	MODPARA	00265	00000 00316	
.	C0277			0	MODACQUI	00266	00000 00312	
.	C03CC			0	MODCC	00267	00000 00276	
.	C0301			0	MODDD	00270	00000 00302	
.	C0302			0	MODPLOT	00271	00000 00322	
.	C0303		MODRADEC	ENT	A*L(RDXXX)*ANOT	00272	11510 53433	
.	C0304			JP	WLRETURN	00273	61000 00325	RETURN TO NORMAL RET OF CURREN T INT/INTERLACE
.	C03C5			RJP	L(RDXXX)	00274	65010 53433	
.	C0306			JP	WLRETURN	00275	61000 00325	RETURN TO NORMAL RET OF CURREN T INT/INTLACE
.	C0307		MODCC	ENT	A*L(CHCOR)*ANOT	00276	11510 53422	
.	C0310			JP	WLRETURN	00277	61000 00325	RETURN TO NORMAL RET OF CURREN T INT/INTERLACE
.	C0311			RJP	A*	00300	65070 00000	REINIT CHANGE CORE
.	C0312			JP	WLRETURN	00301	61000 00325	RETURN TO NORMAL RET OF CURREN T INT/INTLACE
.	C0313		MODDD	ENT	A*L(DYOMP)*ANOT	00302	11510 53421	
.	C0314			JP	WLRETURN	00303	61000 00325	RETURN TO NORMAL RET OF CURREN T INT/INTERLACE
.	C0315			RJP	A*	00304	65070 00000	REINIT DYNAMIC DUMP
.	C0316			JP	WLRETURN	00305	61000 00325	RETURN TO NORMAL RET OF CURREN T INT/INTLACE
.	C0317		MODCOR	ENT	A*L(CORCT)*ANOT	00306	11510 53420	
.	C0320			JP	WLRETURN	00307	61000 00325	RETURN TO NORMAL RET OF CURREN T INT/INTERLACE
.	C0321			RJP	A*	00310	65070 00000	REINI RADAR CORRECTION
.	C0322			JP	WLRETURN	00311	61000 00325	RETURN TO NORMAL RET OF CURREN T INT/INTLACE
.	C0323		MODACQUI	ENT	A*L(ACQUI)*ANOT	00312	11510 53427	
.	C0324			JP	WLRETURN	00313	61000 00325	RETURN TO NORMAL RET OF CURREN T INT/INTERLACE
.	C0325			RJP	A	00314	65070 00000	
.	C0326			JP	WLRETURN	00315	61000 00325	RETURN TO NORMAL RET OF CURREN T INT/INTLACE
.	C0327		MODPARA	ENT	A*L(CHPAR)*ANOT	00316	11510 53431	
.	C0330			JP	WLRETURN	00317	61000 00325	RETURN TO NORMAL RET OF CURREN T INT/INTLACE
.	C0331			RJP	A	00320	65070 00000	
.	C0332			JP	WLRETURN	00321	61000 00325	RETURN TO NORMAL RET OF CURREN T INT/INTLACE
.	C0333		MODPLOT	ENT	A*L(PLOTP)*ANOT	00322	11510 53436	

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CARDS    LI ID LABEL      TA STATEMENT                                LOC    F JKB Y      NOTES
   .     C0334              JP   WLRETURN                             00325  51000 00325  RETURN TO NORMAL RET OF CURREN
                                                                                          T INT/INTLACE
   .     C0335              RJP  A*                                   00324  65070 00000
   .     C0335 WLRETURN     ENT  A*L(INTERCOM)                        00325  11010 53426  HAS ATTENTION RETURN POINT
   .     C0337              STR  A*L($+1                              00326  15010 00327
   .     C0340              ENT  A*L(0)                               00327  11010 00000
   .     C0341              ADD  A*1                                  00330  20000 00001
   .     C0342              JP   A                                    00331  61070 00000  BACK TO WAIT LOOP
   .     C0343 CALLNEWRUN   TERM AZCHAN*OUTPUT                        00332  67540 00000
   .     C0344              TERM ELCHAN*OUTPUT                        00333  67500 00000
   .     C0345              CLEAR      16D*EXPNAME                    00334  70100 00020
                                                                     00335  16030 53350
   .     C0346              RJP  U(INTERCOM)                          00336  65020 53426
   .     C0347              U-TAG      NAMEMSG*REPLY2                 00337  02325 02331  FOR EXPERIMENT NAME
   .     C0350              ENT  A*L(TIMEP)*ANOT                      00340  11510 53435
   .     C0351              JP   FORCELCOMP                           00341  61000 00343
   .     C0352              RJP  L(TIMEP)                             00342  65010 53435  INITIALIZE SYSTEM TIMING
   .     C0353 FORCELCOMP   RJP  U(INTERCOM)                          00343  65020 53426  FIND OUT WHICH CELESTIAL COMPU
                                                                                          TATION PGM
   .     C0354              U-TAG      CELPGMMSG*REPLY7               00344  02344 02365
   .     C0355              PUT  CCPINCORE*L(SAYWHICH)                00345  10000 01372
                                                                     00346  14010 01401
   .     C0356              PUT  CELCOMPGM*L(WHCHCLSPGM)              00347  10000 53424
                                                                     00350  14010 01377
   .     C0357              PUT  FORCELCOMP*L(ERRORRET)               00351  10000 00343
                                                                     00352  14010 01414
   .     C0360              ENT  A*L(CELCHOICE)                       00353  11010 02371
   .     C0361              SUB  A*1*APOS                             00354  21600 00001
   .     C0362              JP   FORCELCOMP                           00355  61000 00343
   .     C0363              ADD  A*CELPGMCODE                         00356  20000 02375
   .     C0364              STR  A*L($+1)                             00357  15010 00360
   .     C0365              ENT  A*W(0)                               00360  11030 00000  SEARCH KEY
   .     C0366              STR  A*W(SEARCHKEY)                       00361  15030 02405
   .     C0367              SUB  A*W(CCPINCORE)*AZERO                 00362  21430 01372
   .     C0370              RJP  BLOCKIN                              00363  65000 01276  S.R WILL PLACE CEL COM PGM IN
                                                                                          CORE
   .     C0371              ENT  A*CELPGMSTAT-1                       00364  11000 02415  SET UP SYSSTAT2 FOR CELCOMPGM
                                                                                          OPERATING
   .     C0372              ADD  A*L(CELCHOICE)                       00365  20010 02371
   .     C0373              STR  A*L($+1)                             00366  15010 00367
   .     C0374              ENT  A*W(0)                               00367  11030 00000
   .     C0375              STR  A*W(SYSTAT2)                         00370  15030 53314  HAS ER OR AU + CEL COMP PGM NO

   .     C0376              SEL  CL*X77700                            00371  52040 77700
   .     C0377              ADD  A*NICETABLE-1                        00372  20000 02405
   .     C04CC              STR  A*L($+1)                             00373  15010 00374
   .     C0401              ENT  A*W(0)                               00374  11030 00000
   .     C0402              STR  A*W(NICEMSG)                         00375  15030 02434
   .     C0403              ENT  A*L(COCON)*ANOT                      00376  11510 53414
   .     C0404              JP   $+2                                  00377  61000 00401
   .     C0405              RJP  L(COCON)                             00400  65010 53414  COORDINATE  CONVERSION
   .     C0406              ENT  A*L(RDXXX)*ANOT                      00401  11510 53433
   .     C0407              JP   $+2                                  00402  61000 00404
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CARDS    EJ ID LABEL      TA STATEMENT                                LOC    F JKB Y      NOTES

.     C0410               RJP  L(RDXXX)                             00403  65010 53433
.     C0411 GOTONE        ENT  A*L(WFORD)*ANOT                      00404  11510 53432
.     C0412               JE   $+2                                  00405  51000 00407
.     C0413               RJP  A                                    00406  65070 00000
.     C0414               COMMENT   NOW                                                INITIAZE REMAINDER OF SYSTEM
.     C0415               ENT  A*W(TIMEMODE)*ANEG                   00407  11730 53103
.     C0416               JP   SITNORMAL                            00410  61000 00423
.     C0417               ENT  Q*W(DUMSECTTG)                       00411  10030 53154
.     C0420               MUL  50000                                00412  22000 11610
.     C0421               STR  Q*W(DUM200)                          00413  14030 02276
.     C0422               STR  Q*W(BLASTOFF)                        00414  14030 53146
.     C0423               ENT  Q*W(FRAMESIZE)                       00415  10030 53101
.     C0424               MUL  3                                    00416  22000 00003
.     C0425               STR  Q*W(TEMP)                            00417  14030 04126
.     C0426               ENT  A*W(DUMSECTTG)                       00420  11030 53154
.     C0427               ADD  A*W(TEMP)                            00421  20030 04126
.     C0430               JP   BREAKIN                              00422  61000 00462
.     C0431 SITNORMAL     RJP  READCLOCK                            00423  65000 01437
.     C0432               ENT  Q*W(HOURREG)*QPOS                    00424  10230 53151
.     C0433               CL   W(MINREG)                            00425  16030 53152  IS ASAP
.     C0434               MUL  180000000                            00426  22030 04153  CONVERT TO 200 MICROSECONDS

.     C0435               STR  Q*W(TEMP)                            00427  14030 04126
.     C0436               ENT  Q*W(MINREG)                          00430  10030 53152
.     C0437               MUL  300000D                              00431  22030 04154
.     C0440               ADD  Q*W(TEMP)                            00432  26030 04126
.     C0441               STR  Q*W(BLASTOFF)                        00433  14030 53146
.     C0442               ENT  Q*W(GMTMODU24)                       00434  10030 53145
.     C0443               CL   A*                                   00435  11000 00000
.     C0444               DIV  50000                                00436  23000 11610
.     C0445               SUB  A*25000*ANEG                         00437  21700 04704
.     C0446               ADD  Q*1                                  00440  26000 00001
.     C0447               MUL  50000                                00441  22000 11610
.     C0450               ADD  Q*W(DELAYTIME)                       00442  26030 04133
.     C0451               SUB  Q*4320000D0D*QPOS                    00443  27530 04155
.     C0452               ADD  Q*4320000000                         00444  26030 04155
.     C0453               STR  Q*W(TSUBZERO)                        00445  14030 04135
.     C0454               SUB  Q*W(BLASTOFF)*QPOS                   00446  27530 53146
.     C0455               JP   $+3                                  00447  61000 00452
.     C0456               PUT  W(TSUBZERO)*W(BLASTOFF)              00450  10030 04135
                                                                    00451  14030 53146
.     C0457               CL   A                                    00452  11000 00000
.     C0460               ENT  Q*W(BLASTOFF)*QPOS                   00453  10230 53146
.     C0461               CP   A*                                   00454  15040 00000  NEGATIVE TIME
.     C0462               DIV  50000                                00455  23000 11610
.     C0463               JP   SIMU*QNEG                            00456  50300 00461
.     C0464               SUB  A*25000*ANEG                         00457  21700 04704
.     C0465               ADD  Q*1                                  00460  26000 00001
.     C0466 SIMU          STR  Q*A                                  00461  14040 00000
.     C0467 BREAKIN       CL   Q*APOS                               00462  10600 00000
.     C0470               CP   Q*                                   00463  14000 00000
.     C0471               RSH  AQ*2                                 00464  03000 00002
.     C0472               DIV  864000                               00465  23030 04152
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CARDS	LI ID LABEL	TA STATEMENT	LOC	F JKB Y	NOTES
.	C0473	STR Q*W(TRUETIME)	00466	14030 53132	
.	C0474	STR Q*W(CELTIME)	00467	14030 53133	
.	C0475	STR Q*W(SCELTIME)	00470	14030 53134	
.	C0476	STR Q*W(CONVERTIME)	00471	14030 53135	
.	C0477	STR Q*W(SRAOTIME)	00472	14030 53136	
.	C0500	CL Q	00473	10000 00000	
.	C0501	ENT A*W(FRAMESIZE)	00474	11030 53101	
.	C0502	RSH AQ*2	00475	03000 00002	
.	C0503	DIV 864000	00476	23030 04152	
.	C0504	STR Q*W(TEMP)	00477	14030 04126	
.	C0505	ENT A*W(CELTIME)	00500	11030 53133	
.	C0506	SUB A*W(TEMP)	00501	21030 04126	
.	C0507	STR A*W(CONVERTIME)	00502	15030 53135	FOR BELTS
.	C0510	RJP U(COCON)	00503	65020 53414	
.	C0511	ENT A*L(CELCOMPGM)*ANOT	00504	11510 53424	
.	C0512	JP $+3	00505	61000 00510	
.	C0513 INITIALCP	RJP L(CELCOMPGM)	00506	65010 53424	
.	C0514	RJP CCPERROR	00507	65000 01460	
.	C0515	PUT W(MCP+1)*W(IDICELCOR)	00510	10030 00001	ID THE RECORDING OF C.STORAGE
			00511	14030 53000	
.	C0516	STR Q*W(MCPFILLER)	00512	14030 71000	
.	C0517	ENT A*L(RECRD)*ANOT	00513	11510 53415	
.	C0520	JP $+3	00514	61000 00517	
.	C0521	CL A*	00515	11000 00000	
.	C0522	RJP L(RECRD)	00516	65010 53415	INITIALIZE RECORDING
.	C0523	ENT A*L(ACQUI)*ANOT	00517	11510 53427	INITIALIZE ACQUIZITION
.	C0524	JP $+2	00520	61000 00522	
.	C0525	RJP A	00521	65070 00000	
.	C0526	ENT A*L(INTER)*ANOT	00522	11510 53413	
.	C0527	JP $+2	00523	61000 00525	
.	C0530	RJP L(INTER)	00524	65010 53413	INTERPOLATION
.	C0531	ENT A*L(PLOTP)*ANOT	00525	11510 53436	INITIALIZE CHAN 5 PLOT PROGRAM
.	C0532	JP $+2	00526	61000 00530	
.	C0533	RJP A	00527	65070 00000	
.	C0534	ENT A*W(FIRSTHRU)*AZERO	00530	11430 53153	
.	C0535	JP PRESETTTG	00531	61000 00536	
.	C0536	STR 80*CPW(FIRSTHRU)	00532	16070 53153	
.	C0537	ENT A*L(CORCT)*ANOT	00533	11510 53420	
.	C0540	JP $+2	00534	61000 00536	
.	C0541	RJP L(CORCT)	00535	65010 53420	A + E CORRECTION
.	C0542 PRESETTTG	CL W(OPPCHOICE)	00536	16030 01524	
.	C0543	RJP U(INTERCOM)	00537	65020 53426	ASK FOR DATA PROCESSING PGM CH OICE
.	00544	U-TAG OPPMSG*OPPANS	00540	01474 01520	
.	C0545	ENT A*L(OPPCHOICE)*ANOT	00541	11510 01524	
.	C0546	JP NODPP	00542	61000 00564	NOT WANTED
.	C0547	SUB A*1	00543	21000 00001	
.	00550	ADD A*OPPGMCODE	00544	20000 02372	START OF TABLE
.	C0551	STR A*L($+1)	00545	15010 00545	
.	C0552	ENT A*W(0)	00546	11030 00000	
.	C0553	STR A*W(SEARCHKEY)	00547	15030 02405	
.	C0554	SUB A*W(OPPINCORE)*ANOT	00550	21530 01373	
.	C0555	JP INITOPP	00551	61000 00561	ALREADY IN

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CARDS    LI ID LABEL      TA STATEMENT                          LOC    F JKB Y      NOTES

   .     C0556              PUT  DPPINCORE*L(SAYWHICH)          00552  10000 01373
                                                                00553  14010 01401
   .     D0557              PUT  DATANALYZE*L(WHCHCLSPGM)       00554  10000 53425  SET FOR OPP (BLOCKIN)
                                                                00555  14010 01377
   .     C056C              PUT  PRESETTTG*L(ERRORRET)          00556  10000 00536
                                                                00557  14010 01414
   .     C0561              RJP  BLOCKIN                        00560  65000 01276
   .     CU562 INITDPP      ENT  A*L(DATANALYZE)*ANOT           00561  11510 53425
   .     C0563              JP   $+2                            00562  61000 00564
   .     C0564              RJP  A*                             00563  65070 00000  INITIALIZE CHOSEN DPP
   .     C0565 NODPP        ENT  A*W(TIMEMODE)*ANEG             00564  11730 53103
   .     CU566              JP   SETTDGU                        00565  61000 00573
   .     C0567              ENT  A*W(OUMSECTTG)                 00566  11030 53154
   .     C0570              STR  A*W(SECSNOW)                   00567  15030 04136
   .     C0571              SUB  A*L(FRAMESIZE)                 00570  21010 53101
   .     C0572              STR  A*W(DSECONDS)                  00571  15030 53141
   .     C0573              JP   BREAKIN2                       00572  61000 00646
   .     C0574 SETTDGO      RJP  READCLOCK                      00573  65000 01437
   .     C0575              ENT  Q*W(HOURREG)*QPOS              00574  10230 53151  HOUR TO BEGIN IF POS
   .     C0576              CL   W(MINREG)                      00575  16030 63152  GO WHEN READY  (ASAP)
   .     C0577              MUL  180000000                      00576  22030 04153  CONVERT TO UNITS OF 200 MICROS
                                                                                     ECONDS
   .     C060C              STR  Q*W(TEMP)                      00577  14030 04126
   .     C0601              ENT  Q*W(MINREG)                    00600  10030 53152
   .     C0602              MUL  300000D                        00601  22030 04154  200MS / MINUTE
   .     C0603              ADD  Q*W(TEMP)                      00602  26030 04126
   .     C0604              STR  Q*W(BLASTOFF)                  00603  14030 53146  CHOSEN TIME TO GO (IN 200MS)

   .     C0605 TOOLATE      ENT  Q*W(GMTMODU24)                 00604  10030 53145
   .     C0606              CL   A*                             00605  11000 00000
   .     C0607              DIV  5000D                          00606  23000 11610
   .     CU61C              SUB  A*25000*ANEG                   00607  21700 04704  1/2 SECOND
   .     C0611              ADD  Q*1                            00610  26000 00001  ND SECONDS OF TIME NOW,ROUNDED

   .     C0612              STR  Q*W(SECSNOW)                   00611  14030 04136  BINARY SECONDS NOW BD
   .     CU613              MUL  5000D                          00612  22000 11610  CONVERT TO 200MS UNITS
   .     C0614              ADD  Q*W(DELAYTIME)                 00613  26030 04133  50000(200MS) = 10 SECONDS
   .     C0615              SUB  Q*4320000000D*QPOS             00614  27530 04155
   .     C0616              ADD  Q*4320000000                   00615  26030 04155
   .     C0617              STR  Q*W(TSUBZERO)                  00616  14030 04135  TIME TO GO (UNLESS DIRECTED TO
                                                                                      WAIT)
   .     CD620              SUB  Q*W(BLASTOFF)*QPOS             00617  27530 53146  IS DIRECTED TIME TO GO LATER

   .     C0621              JP   $+3                            00620  61000 00623  YES MUST WAIT
   .     C0622              ENT  A*W(TSUBZERO)                  00621  11030 04135  IS LATER THAN ELECTED START TI
                                                                                     ME
   .     C0623              STR  A*W(BLASTOFF)                  00622  15030 53146  EXCHANGE ELECTED TIME WITH PRE
                                                                                     SENT TIME
   .     C0624              ENT  Q*W(BLASTOFF)                  00623  10030 53146
   .     C0625              CL   A*                             00624  11000 00000
   .     C0626              DIV  5000D                          00625  23000 11610
   .     C0627              SUB  A*25000*ANEG                   00626  21700 04704
   .     CU63C              ADD  Q*1                            00627  26000 00001
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CARDS	LI	ID	LABEL	TA	STATEMENT	LOC	F	JKB	Y	NOTES
.	C0631			STR	Q*W(TEMP+4)	00630	14030	04132		80 IN SECS
.	C0632		BUILDUP	SUB	Q*W(SECSNOW)	00631	27030	04136		
.	C0633			SUB	Q*2*QNEG	00632	27700	00002		
.	C0634			JP	ATLEAST2	00633	61000	00636		
.	C0635			RPL	Y+1*W(TEMP+4)	00634	36030	04132		
.	C0636			JP	BUILDUP	00635	61000	00631		
.	C0637		ATLEAST2	ENT	Q*W(TEMP+4)	00636	10030	04132		
.	C0640			MUL	5000	00637	22000	11610		
.	C0641			SUB	Q*4320000000*QPOS	00640	27530	04155		
.	C0642			ADD	Q*4320000000	00641	26030	04155		
.	C0643			STR	Q*W(BLASTOFF)	00642	14030	53146		
.	C0644			ENT	A*W(TEMP+4)	00643	11030	04132		
.	C0645			SUB	A*2	00644	21000	00002		
.	C0646			STR	A*W(OSECONDS)	00645	15030	53141		
.	C0647		BREAKIN2	CL	Q*	00646	10000	00000		
.	C0650			ENT	A*W(SECSNOW)*APOS	00647	11630	04136		
.	C0651			CP	Q*	00650	14000	00000		
.	C0652			RSH	AQ*2	00651	03000	00002		
.	C0653			DIV	864000	00652	23030	04152		
.	C0654			STR	Q*W(TRUETIME)	00653	14030	53132		
.	C0655			CL	Q*	00654	10000	00000		
.	C0656			ENT	A*W(OSECONDS)*APOS	00655	11630	53141		
.	C0657			CP	Q*	00656	14000	00000		
.	C0660			RSH	AQ*2	00657	03000	00002		
.	C0661			DIV	864000	00660	23030	04152		
.	C0662			STR	Q*W(CELTIME)	00661	14030	53133		TIME OF COMPUTATION (DAYS B28)
.	C0663			STR	Q*W(SCELTIME)	00662	14030	53134		
.	C0664			STR	Q*W(CONVERTIME)	00663	14030	53135		
.	C0665			STR	Q*W(SRADTIME)	00664	14030	53136		
.	C0666			CL	A*	00665	11000	00000		
.	C0667			ENT	Q*W(OSECONDS)*QPOS	00666	10230	53141		
.	C0670			CP	A*	00667	15040	00000		
.	C0671			DIV	3600	00670	23000	07020		
.	C0672			STR	Q*U(HOURMINUTE)	00671	14020	53137		
.	C0673			STR	A*Q	00672	15000	00000		
.	C0674			CL	A*QPOS	00673	11200	00000		
.	C0675			CP	A*	00674	15040	00000		
.	C0676			DIV	60D	00675	23000	00074		
.	C0677			STR	Q*L(HOURMINUTE)	00676	14010	53137		
.	C0700			STR	A*U(SECONDS)	00677	15020	53140		
.	C0701			CL	B1*	00700	12100	00000		GO TO OUTPUT COMPUTATION SUBRO UTINE 4 TIMES FOR INIT
.	C0702		INCYCLE	CL	B2*	00701	12200	00000		
.	C0703			RJP	COMPLOOP	00702	65000	01576		
.	C0704		INITIALIZE	ENT	A*L(FRAMESIZE)	00703	11010	53101		
.	C0705			CL	Q*	00704	10000	00000		
.	C0706			RPL	A+Y*W(OSECONDS)*APOS	00705	24630	53141		
.	C0707			CP	Q*	00706	14000	00000		
.	C0710			RSH	AQ*2	00707	03000	00002		
.	C0711			DIV	864000	00710	23030	04152		
.	C0712			STR	Q*W(CELTIME)	00711	14030	53133		
.	C0713			STR	Q*W(SCELTIME)	00712	14030	53134		

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CARDS    LI ID LABEL      TA STATEMENT                          LOC    F JKB Y      NOTES

   .     C0714              STR  Q*W(CONVERTIME)                00713  14030 53135
   .     C0715              STR  Q*W(SRADTIME)                  00714  14030 53136
   .     C0716              BSK  B1*3                           00715  71100 00003
   .     C0717              JP   INCYCLE                        00716  61000 00701
   .     C0720              PUT  W(PREOUTMS)*W(1)               00717  10030 04145  INITIAL AZ + EL TO DISPLAY
                                                                00720  14030 00001
   .     C0721              PUT  W(PREOUTWF)*W(2)               00721  10030 04144
                                                                00722  14030 00002
   .     C0722              OUT  INTERSITE*W(PREOUTMS)          00723  74630 04145
   .     C0723              PUT  W(ANSDOPINT)*W(31)             00724  10030 04146  ANSWER EXTERNAL INT. CHAN 9 (D
                                                                                      OPPLER)
                                                                00725  14030 00031
   .     C0724              PUT  W(SVROXXX)*W(RDXXX)            00726  10030 02565  RESTORE RADEC IN COMP LOOP
                                                                00727  14030 53433
   .     C0725              ENT  A*W(TIMEMODE)*ANEG             00730  11730 53103
   .     C0726              JP   GETALONG                       00731  61000 00735
   .     C0727              ENT  A*L(PLANP)*ANOT                00732  11510 53434
   .     C0730              JP   GETALONG                       00733  61000 00735
   .     C0731              RJP  L(PLANP)                       00734  65010 53434
   .     C0732 GETALONG     ENT  A*L(FRAMESIZE)                 00735  11010 53101
   .     C0733              CP   A*                             00736  15040 00000
   .     C0734              RPL  A+Y*W(OSECONDS)                00737  24030 53141
   .     C0735 WATCHTIME    RJP  L(INTERCOM)                    00740  65010 53426
   .     C0736              RJP  ATTENTION                      00741  65000 00043
   .     C0737              NO-OP                               00742  12000 00000
   .     C0740              RJP  READCLOCK                      00743  65000 01437
   .     C0741              OUT  AZCHAN*W(PREOUTAZ)             00744  74570 04142  OUTPUT FIRST ANGLES TO DISPLAY

   .     C0742              NO-OP                               00745  12000 00000
   .     C0743              OUT  ELCHAN*W(PREOUTEL)             00746  74530 04143
   .     C0744              ENT  A*W(TIMEMODE)*APOS             00747  11530 53103
   .     C0745              JP   LIFTOFF                        00750  61000 00762
   .     C0746              ENT  A*W(GMTMODU24)                 00751  11030 53145
   .     C0747              SUB  A*W(BLASTOFF)*APOS             00752  21530 53146
   .     C0750              JP   WATCHTIME                      00753  61000 00740  NOT YET
   .     C0751              COM  A*4140000000D*YMORE            00754  04730 04156
   .     C0752              JP   WATCHTIME                      00755  61000 00740  APPROACHING MIDNIGHT G.M.T.
   .     C0753              COM  A*10D*YLESS                    00756  04600 00012
   .     C0754              JP   LIFTOFF                        00757  61000 00762  AWAY WE GO  (HAR DE HA HA)
   .     C0755              RJP  READCLOCK                      00760  65000 01437  MISSED IT. TRY AGAIN
   .     C0756              JP   TOOLATE                        00761  61000 00604
   .     C0757 LIFTOFF      PUT  12000*U(CANMOVE)               00762  10000 12000
                                                                00763  14020 00773
   .     C0760              STR  80*CPL(SYSTAT1)                00764  16050 53313
   .     C0761              PUT  64100*U(ENDISABLE)             00765  10000 64100
                                                                00766  14020 01000
   .     C0762 NWLOOP       CL   W(WTLPSWOPP)                   00767  16030 02062
   .     C0763              RJP  L(INTERCOM)                    00770  65010 53426
   .     C0764              RJP  ATTENTION                      00771  65000 00043
   .     C0765              NO-OP                               00772  12000 00000
   .     C0766 CANMOVE      JP   NWLOOP                         00773  61000 00767
   .     C0767              ENT  A*W(RECORDSIZE)*APOS           00774  11530 53112
   .     C0770              JP   SYSISSIM                       00775  61000 01015
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CARDS    LI ID LABEL       TA STATEMENT                                LOC    F JKB Y      NOTES

   .     C0771             ENT  A*W(AZBUFSWOPP)*APOS                   00776  11530 02063
   .     C0772             JP   CHECKOPP                               00777  61000 01003
   .     C0773 ENDISABLE   SILRJP     AZBUFINTRP                       01000  64100 02064
   .     C0774             PUT  12000*U(ENDISABLE)                     01001  10000 12000
                                                                        01002  14020 01000
   .     C0775 CHECKOPP    ENT  A*L(OPPCHOICE)*AZERO                   01003  11410 01524
   .     C0776             ENT  A*U(DATAVALYZE)*ANOT                   01004  11520 53425
   .     C0777             JP   NWLOOP+1                               01005  61000 00770
   .     C1000             ENT  Q*W(AZBUFSWOPP)*QNEG                   01006  10330 02063
   .     C1001             JP   NWLOOP                                 01007  61000 00767
   .     C1002             STR  B0*CPW(WTLPSWOPP)                      01010  16070 02062
   .     C1003             RJP  A*                                     01011  65070 00000
   .     C1004             JP   $+1                                    01012  61000 01013
   .     C1005             CL   W(AZBUFSWOPP)                          01013  16030 02063
   .     C1006             JP   NWLOOP                                 01014  61000 00767
   .     C1007 SYSISSIM    ENT  A*W(RELEASESW)*AZERO                   01015  11430 53156  SET BY RECORDING   +0 = FINISH
                                                                                          EO
   .     C1010             JP   $-1                                    01016  61000 01015
   .     C1011             JP   $*CONSOLE*ACTIVEOUT                    01017  53100 01017
   .     C1012             SILRJP     AZBUFINTRP                       01020  64100 02064
   .     C1013             JP   CHECKOPP                               01021  61000 01003
   .     C1014 SENDOPPLER  ENTRY                                       01022  61000 00000
   .     C1015             STR  A*W(ARSV)                              01023  15030 01054
   .     C1016             STR  Q*W(QRSV)                              01024  14030 01055
   .     C1017             STR  B3*L(B3SV)                             01025  16310 01050
   .     C1020             STR  B7*U(SENDOPPLER)                       01026  16720 01022
   .     C1021             CL   B3                                     01027  12300 00000
   .     C1022             ENT  A*L(133)                               01030  11010 00133  PICK UP LOC NEXT AZ TO BE OUTP
                                                                                          UT
   .     C1023             SUB  A*U(AZIMADD)                           01031  21020 53442  SUB BASE LOC OF ACTIVE BUFFER
                                                                                          FOR AZ
   .     C1024             ADD  A*U(DOPPADD)                           01032  20020 53444  BASE ACTIVE DOPPLER BUFFER
   .     C1025             STR  A*L($+1)                               01033  15010 01034  SET TO PICK UP THIS DOPPLER
   .     C1026             ENT  Q*W(0)                                 01034  10030 00000  CONVERT TO QUASI BCD
   .     C1027             CL   W(HSD)                                 01035  16030 01053
   .     C1030 CYCLEPT     CL   A*                                     01036  11000 00000
   .     C1031             DIV  100                                    01037  23000 00012  VARIABLE SHIFT
   .     C1032             RPT  B3                                     01040  70003 00000
   .     C1033             LSH  A*4                                    01041  06000 00004
   .     C1034             RSF  SET*W(HSD)                             01042  54030 01053
   .     C1035             FSK  B3*6                                   01043  71300 00006  7 BCD DIGITS
   .     C1036             JP   CYCLEPT                                01044  61000 01036
   .     C1037             OUT  DOPPCHAN*W(HSD)                        01045  74470 01053
   .     C1040             ENT  A*W(ARSV)                              01046  11030 01054
   .     C1041             ENT  Q*W(QRSV)                              01047  10030 01055
   .     C1042 B3SV        ENT  B3*0                                   01050  12300 00000
   .     C1043             ENT  B7*U(SENDOPPLER)                       01051  12720 01022
   .     C1044             RILJP      L(SENDOPPLER)                    01052  60110 01022
   .     C1045 HSD         0                                           01053  00000 00000
   .     C1046 ARSV        0                                           01054  00000 00000
   .     C1047 QRSV        0                                           01055  00000 00000
   .     C1050 ENTRYSORT   ENTRY                                       01056  61000 00000
   .     C1051             ENT  A*W(FIRSTTHRU)*AZERO                   01057  11430 53153
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SPURT OUTPUT NO. 210
MCP JDO*6/1/65

CARDS	LI	IC	LABEL	TA	STATEMENT	LOC	F JKB Y	NOTES
.	C1052			JP	MUSTSETUP	01060	51000 01205	00 PARTIAL INIALIZATION
.	C1053			ENT	A*FDADSCN	01061	11000 02542	
.	C1054			SUB	A*ICNAMTAB	01062	21000 02522	
.	C1055			STR	A*L(HOWANY)	01063	15010 02564	
.	C1056		SETUPSRCH	RPT	500*AOV	01064	70100 00062	
.	C1057			ENT	A*W(SYSNAMES)*AZERO	01065	11430 77700	
.	C1060			JP	$+1*STOP	01066	61400 01067	
.	C1061			ENT	A*490	01067	11000 00061	
.	C1062			SUB	A*B7	01070	21007 00000	
.	C1063			STR	A*L(NOPGMS)	01071	15010 02616	
.	C1064			STR	A*L(SETRPT)	01072	15010 01100	
.	C1065			ADD	A*SYSNAMES-1	01073	20000 77677	
.	C1066			STR	A*L(SETCOM)	01074	15010 01101	
.	C1067			CL	B1*	01075	12100 00000	LOCATE IN CORE PGMS
.	C1070		LOOPER	ENT	Q*X77777	01076	10040 77777	
.	C1071			ENT	A*W(ICNAMTAB+B1)	01077	11031 02522	
.	C1072		SETRPT	RPT	0*BACK	01100	70200 00000	NUMBER OF PGMS
.	C1073		SETCOM	COM	MASK*W(0)*AZERO	01101	43430 00000	LAST PGM
.	C1074			JP	SAYOUT	01102	61000 01107	
.	C1075			JP	ITSIN	01103	61000 01126	
.	C1076		TESTLP	BSK	B1*L(HOWANY)	01104	71110 02564	
.	C1077			JP	LOOPER	01105	61000 01076	
.	C1100			JP	NXTOP	01106	61000 01133	
.	C1101		SAYOUT	ENT	A*L(ICLOCTAB+B1)	01107	11011 02543	
.	C1102			STR	A*L($+1)	01110	15010 01111	
.	C1103			CL	W(0)	01111	16030 00000	SET THIS PGM INACTIVE
.	C1104			PUT	12000*U(INSERTA)	01112	10000 12000	
						01113	14020 01120	
.	C1105			PUT	W(ICNAMTAB+B1)*W(ABSENTMSG)	01114	10031 02522	
						01115	14030 02610	
.	C1106		PREENTRA	RJP	L(INTERCOM)	01116	65010 63426	
.	C1107			RJP	ATTENTION	01117	65000 00043	
.	C1110		INSERTA	NO-OP		01120	12000 00000	
.	C1111			PUT	W(FORA)*W(INSERTA)	01121	10030 02605	
						01122	14030 01120	
.	C1112			RJP	U(INTERCOM)	01123	65020 53426	
.	C1113			U-TAG	ABSENT*0	01124	02506 00000	
.	C1114			JP	TESTLP	01125	61000 01104	
.	C1115		ITSIN	ENT	A*L(ICLOCTAB+B1)	01126	11011 02543	
.	C1116			STR	A*L(SETADRS)	01127	15010 01131	
.	C1117		SETPICKJP	ENT	A*W(SYSENTRIES+B7)	01130	11037 77600	
.	C1120		SETADRS	STR	A*W(0)	01131	15030 00000	
.	C1121			JP	TESTLP	01132	61000 01104	
.	C1122		NXTOP	PUT	W(FFREQ)*W(FREQUENCY)	01133	10030 02430	
						01134	14030 53317	
.	C1123			PUT	W(HSLAT)*W(GEODETLAT)	01135	10030 02570	
						01136	14030 53321	
.	C1124			PUT	W(HSLONG)*W(LONGITUDE)	01137	10030 02571	
						01140	14030 63320	
.	C1125			PUT	W(EQUATVAL)*W(EQUATOR)	01141	10030 02600	
						01142	14030 53323	
.	C1126			PUT	W(POLEVAL)*W(POLE)	01143	10030 02601	
						01144	14030 63324	

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CARDS    LI IS LABEL      TA STATEMENT                                  LOC    F JKB Y      NOTES
   .     C1127            PUT  W(HEIGHTVAL)*W(HEIGHT)                   01145  10030 02602
                                                                         01146  14030 53326
   .     C1130            PUT  W(FORWFFREQ)*W(WFFREQ)                   01147  10030 02567
                                                                         01150  14030 53333
   .     C1131            PUT  W(FORMSFREQ)*W(MSFREQ)                   01151  10030 02566
                                                                         01152  14030 53332
   .     C1132            PUT  W(HENRY)*W(DELTATEE)                     01153  10030 02431
                                                                         01154  14030 53316
   .     C1133            PUT  W(LIGHTVEL)*W(VELOFLIGHT)                01155  10030 02572  VELOCITY OF LIGHT
                                                                         01156  14030 53335
   .     C1134            PUT  W(LSPAU)*W(LSPERAU)                      01157  10030 02573  LIGHT SECONDS PER A.U.
                                                                         01160  14030 53336
   .     C1135            PUT  W(FLATT)*W(FLATTENING)                   01161  10030 02574  FLATTENING
                                                                         01162  14030 53337
   .     C1136            PUT  W(NMPAU)*W(NMPERAU)                      01163  10030 02575  NNAUTICAL MILES PER A.U.
                                                                         01164  14030 53340
   .     C1137            PUT  W(AUPEQUAT)*W(AUPEREQUAT)                01165  10030 02576  A.U. IN E.E.R.
                                                                         01166  14030 53341
   .     C1140            PUT  W(KMPNM)*W(KMPERNM)                      01167  10030 02577  KILOMETERS PER N.M.
                                                                         01170  14030 53342
   .     C1141            PUT  W(SKIP)*W(137)                           01171  10030 53331  ENTRANCE TO TOPS
                                                                         01172  14030 00137
   .     C1142            PUT  W(RDXXX)*W(SVRDXXX)                      01173  10030 53433
                                                                         01174  14030 02565
   .     C1143            CL   W(AZIMOVER)                              01175  16030 53325
   .     C1144            CL   W(SINAZEL)                               01176  16030 53066
   .     C1145            CL   W(SINORIENT)                             01177  16030 53064
   .     C1146            PUT  200000000D*W(COSAZEL)                    01200  10030 04157
                                                                         01201  14030 53070
   .     C1147            STR  0*W(COSORIENT)                           01202  14030 53065
   .     C1150            PUT  -1*W(PREVIOUSTM)                         01203  10040 77776
                                                                         01204  14030 53461
   .     C1151 MUSTSETUP  CL   W(MAINSWITCH)                            01205  16030 53334
   .     C1152            CL   W(TIMECORR)                              01206  16030 53107  ACQUIZITION DELTA T
   .     C1153            CL   W(KYBROLEVEL)                            01207  16030 53110  SILENC WHEN PLANNING
   .     C1154            CL   W(RECORDSIZE)                            01210  16030 53112
   .     C1155            ENT  B2*L(MAINSWITCH)                         01211  12210 53334
   .     C1156            PUT  W(SWINAZ+B2)*W(INAZIMADD)                01212  10032 02252
                                                                         01213  14030 53446
   .     C1157            PUT  W(SWINEL+B2)*W(INELEVADD)                01214  10032 02254
                                                                         01215  14030 53447
   .     C1160            PUT  W(SWOUTAZ+B2)*W(AZIMADD)                 01216  10D32 02256
                                                                         01217  14030 53442
   .     C1161            PUT  W(SWOUTEL+B2)*W(ELEVADD)                 01220  10032 0226D
                                                                         01221  14030 53443
   .     C1162            PUT  W(SWOUTDPP+B2)*W(DDPPADD)                01222  10032 02262
                                                                         01223  14030 53444
   .     C1163            PUT  W(SWOUTRNGE+B2)*W(RANGEADD)              01224  10032 02264
                                                                         01225  14030 53445
   .     C1164            PUT  W(SWWFDATA+B2)*W(WFADD)                  01226  10032 02617
                                                                         01227  14030 53450
   .     C1165            PUT  W(SWMSDATA+B2)*W(MILLSTNADD)             01230  10032 02623
                                                                         01231  14030 53451
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CARDS	LI IC LABEL	TA STATEMENT	LOC	F JKB Y	NOTES
.	C1166	RPT 4000*ADV	01232	70100 00620	
.	C1167	CL W(MSOUT)	01233	16030 03304	
.	C1170	PUT 12000*U(INSERT)	01234	10000 12000	
			01235	14020 00037	
.	C1171	STR RO*CPL(SYSTAT1)	01236	16050 53313	SET LWR TO SAY NOT IN BUFFER L OOP
.	C1172	CL U(RDMTR)	01237	16020 53430	
.	C1173	CL W(RADIOMETER)	01240	16030 53102	
.	C1174	CL U(RDXXX)	01241	16020 53433	RADEC NOT TO OPERATE IN PRE KI CK-OFF COMP.
.	C1175	STR RO*CPW(SYSTAT0)	01242	16070 53315	
.	C1176	PUT FORPRINT*U(SYSCOMREG1)	01243	10000 00057	FOR TIMING PGM LINKAGE
			01244	14020 53452	
.	C1177	PUT ANSREW1+1*L(SYSCOMREG1)	01245	10000 00017	FOR CHPAR PGM LINKAGE
			01246	14010 53452	
.	C12CC GOTOPRLOG	ENT A*L(PRLOG)*ANOT	01247	11510 53423	
.	C1201	JP $+2	01250	61000 01252	
.	C1202	RJP L(PRLOG)	01251	65010 53423	PRINTER LOGGING
.	C1203	TERM HSPRINTER*OUTPUT	01252	67140 00000	
.	C1204	PUT W(TOTOPS)*W(0)	01253	10030 01275	
			01254	14030 00000	
.	C1205	EX-FCT DATACHAN*2440404040	01255	13270 04151	
.	C1206	CL W(AZQUEUEWORD)	01256	16030 02063	IN INITIALIZATION
.	C1207	CL W(SYSCOMREG2)	01257	16030 53453	
.	C1210	CL W(SYSCOMREG3)	01260	16030 53454	
.	C1211	NO-OP	01261	12000 00000	
.	C1212	NO-OP	01262	12000 00000	
.	C1213	NO-OP	01263	12000 00000	
.	C1214	NO-OP	01264	12000 00000	
.	C1215	CL W(40)	01265	16030 00040	INTERCOM CHECKS THESE
.	C1216	CL W(42)	01266	16030 00042	FOR SITE CONTROL SET-UP
.	C1217	CL W(RECRDSWTCH)	01267	16030 53155	
.	C1220	PUT 60000*U(52)	01270	10000 60000	RIL FOR PLOT PROG. INPUT MONIT OR INT(ELEV
			01271	14020 00052	
.	C1221	ENT A*1	01272	11000 00001	
.	C1222	RSF CP*L(MAINSWITCH)	01273	55010 53334	
.	C1223	EXIT	01274	61010 01056	
.	C1224	COMMENT			SEARCHKEY HAS MASK FOR FIND
.	C1225 TOTOPS	RJP 237	01275	65000 00237	
.	C1226 BLOCKIN	ENTRY	01276	61000 00000	READ IN CEL OR DATA PGMS FROM TAPE
.	C1227 GOAGAIN	PUT W(JPFMSRCH)*W(35)	01277	10030 01415	
			01300	14030 00035	
.	C1230	TERM INTERSITE*INPUT	01301	66600 00000	STOP CHAN 5 RECORDER
.	C1231	RIL	01302	60000 00000	
.	C1232	IN TAPE*W(DUMMYIN)	01303	73670 01416	
.	C1233	NO-OP	01304	12000 00000	
.	C1234	EX-FCT TAPE*W(SRCHWI)	01305	13670 01417	
.	C1235	NO-OP	01306	12000 00000	
.	C1236	EX-FCT TAPE*W(SEARCHKEY)	01307	13670 02405	
.	C1237	ENT A*U(115)	01310	11020 00115	

SPURT OUTPUT NO. 210
MCP JDO*6/1/65

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CARDS   LI ID LABEL      TA STATEMENT                                  LOC    F JKB Y      NOTES

   .    C1240               SUB  A*77777*ANOT                         01311  21500 77777
   .    C1241               JP   $-2                                  01312  61000 01310
   .    C1242               PUT  W(115)*W(WHEREIS)                    01313  10030 00115
                                                                      01314  14030 01420
   .    C1243               JP   $                                    01315  61000 01315
   .    C1244 LOOKSRCH      STR  TAPE*W(STATUS)                       01316  17570 01421  REWIND
   .    C1245               PUT  W(JPANSREW2)*W(35)                   01317  10030 01424
                                                                      01320  14030 00035
   .    C1246               EX-FCT    TAPE*W(REWSYS)                  01321  13670 01422
   .    C1247               JP   $                                    01322  61000 01322
   .    C125C ANSREW2       STR  TAPE*W(TEMP)                         01323  17670 04126
   .    C1251               ENT  A*U(STATUS)                          01324  11020 01421
   .    C1252               RSH  A*110                                01325  02000 00013
   .    C1253               SUB  A*10*AZERO                           01326  21400 00010
   .    C1254               JP   GXAGAIN                              01327  61000 01403  EXPAND THIS LATER
   .    C1255 FORCKSUM      ENT  A*U(WHEREIS)                         01330  11020 01420
   .    C1256               SUB  A*L(WHEREIS)                         01331  21010 01420
   .    C1257               ADD  A*1                                  01332  20000 00001
   .    C126C               STR  A*L(RPTSUM)                          01333  15010 01337
   .    C1261               PUT  L(WHEREIS)*L(STARTHERE)              01334  10010 01420
                                                                      01335  14010 01340
   .    C1262               CL   A*                                   01336  11000 00000
   .    C1263 RPTSUM        RPT  0*ADV                                01337  70100 00000
   .    C1264 STARTHERE     ADD  A*W(0)                               01340  20030 00000
   .    C1265               JP   READOK*AZERO                         01341  60400 01374  CHECK SUM CORRECT
   .    C1266               RIL                                       01342  60000 00000
   .    C1267               RJP  U(INTERCOM)                          01343  65020 53426
   .    C1270               U-TAG     CSERROR*0                       01344  01346 00000
   .    C1271               JP   GOAGAIN                              01345  61000 01277
   .    C1272 CSERROR       FD   1*A                                  01346  06050 50505
   .    C1273               -0   CSUMMSG                              01347  77777 01350
   .    C1274 CSUMMSG       FD   0*CKSUM ERROR..RETRYING              01350  10203 03222
                                                                      01351  05122 72724
                                                                      01352  27757 52712
                                                                      01353  31273 61623
                                                                      01354  14050 50505
   .    C1275               -0                                        01355  77777 77777
   .    C1276 TELLXED       FD   1*A                                  01356  06050 50505
   .    C1277               -0   $+1                                  01357  77777 01360
   .    C13C0               FD   0*NEW DAY OF THE YEAR DETECTED... NO 01360  23123 40511
                            OW IN FORCE.
                                                                      01361  06360 52413
                                                                      01362  05311 51205
                                                                      01363  36120 62705
                                                                      01364  11123 11210
                                                                      01365  31121 17575
                                                                      01366  75052 32434
                                                                      01367  05162 30513
                                                                      0137C  24271 01275
   .    C1301               -0                                        01371  77777 77777
   .    C1302 CCPINCORE     0                                         01372  00000 00000
   .    C1303 DPPINCORE     0                                         01373  00000 00000
   .    C1304 READOK        ENT  A*L(WHEREIS)                         01374  11010 01420
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CARDS    LI ID LABEL       TA STATEMENT                                  LOC    F JKB Y      NOTES

   .     C1305             STR  A*L($+1)                                 01375  15010 01376
   .     C1306             ENT  A*W(0)                                   01376  11030 00000
   .     C1307 WHCHCLSPGM  STR  A*W(0)                                   01377  15030 00000  SET UP CELCOMPGM OR DATANALYZE

   .     C1310             ENT  Q*W(SEARCHKEY)                           01400  10030 02405
   .     C1311 SAYWHICH    STR  Q*W(0)                                   01401  14030 00000
   .     C1312             RILJP     L(BLOCKIN)                          01402  60110 01276
   .     C1313 GXAGAIN     ENT  A*U(STATUS)                              01403  11020 01421
   .     C1314             RSH  A*110                                    01404  02000 00013
   .     C1315             SUB  A*13*AZERO                               01405  21400 00013
   .     C1316             RILJP     GOAGAIN                             01406  60100 01277
   .     C1317             PUT  W(SEARCHKEY)*W(SORRYMSG)                 01407  10030 02405
                                                                         01410  14030 01425
   .     C1320             RIL                                           01411  60000 00000
   .     C1321             RJP  U(INTERCOM)                              01412  65020 53426
   .     C1322             U-TAG     SORRY*0                             01413  01435 00000
   .     C1323 ERRORRET    RILJP     FORCELCOMP                          01414  60100 00343
   .     C1324 JPEMSRCH    RILJP     LOOKSRCH                            01415  60100 01316
   .     C1325 DUMMYIN     77777     00114                               01416  77777 00114
   .     C1326 UNITNO      EQUALS    1
   .     C1327 SRCHWI      56000     UNITNO                              01417  56000 00001
   .     C1330 WHEREIS     0                                             01420  00000 00000
   .     C1331 STATUS      0                                             01421  00000 00000
   .     C1332 REWSYS      30100     UNITNO                              01422  30100 00001
   .     C1333 JPANSREW1   RILJP     ANSREW1                             01423  60100 00016
   .     C1334 JPANSREW2   RILJP     ANSREW2                             01424  60100 01323
   .     C1335 SORRYMSG    ED   0*      IS NOT ON THIS SYSTEM TAPE.      01425  05050 50505

                                                                         01426  05163 00523
                                                                         01427  24310 52423
                                                                         01430  05311 51630
                                                                         01431  05303 53031
                                                                         01432  12220 53106
                                                                         01433  25127 50505
   .     C1336             -0                                            01434  77777 77777
   .     C1337 SORRY       ED   1*A                                      01435  06050 50505
   .     C1340             -0   SORRYMSG                                 01436  77777 01425
   .     C1341 READCLOCK   ENTRY                                         01437  61000 00000
   .     C1342             PUT  W(TIMEJP)*W(47)                          01440  10030 04124  CLOCK ON CHAN 7
                                                                         01441  14030 00047
   .     C1343             IN   RTCLOCK*W(TIN)*MONITOR                   01442  75370 04125
   .     C1344             RIL                                           01443  60000 00000
   .     C1345             JP   $                                        01444  61000 01444
   .     C1346 TIMESET     ENT  A*W(ACTUALTIME)                          01445  11030 53142
   .     C1347             RSH  A*1                                      01446  02000 00001  PUT HI ORDER TIME BIT IN BIT P
                                                                                           OSITION 27
   .     C1350             SHL  CL*4000000000                            01447  52030 04160  ELIMINATE SIGN BIT
   .     C1351             STR  A*W(ESTSHIFTED)                          01450  15030 53143
   .     C1352             ADD  A*900000000                              01451  20030 04161  5 HOURS IN UNITS OF 200 MICROS
                                                                                           ECONDS
   .     C1353             ADD  A*W(DELTIME)                             01452  20030 02604  ADJUST THE CLOCK
   .     C1354             STR  A*W(GMTSHIFTED)                          01453  15030 53144  MAY EXCEED  24 HOURS
   .     C1355             SUB  A*432000000000*APOS                      01454  21530 04155  24 HOURS OF 200 MICROSECONDS
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CARDS	LI	ID	LABEL	TA	STATEMENT	LOC	F	JKB	Y	NOTES
.	C1356				ADD A*4320000000	01455	20030	04155		
.	C1357				STR A*W(GMTMODU24)	01456	15030	63145		MODULO 24 HOURS
.	C1360				EXIT	01457	61010	01437		
.	C1361	CCPERROR			ENTRY	01460	61000	00000		
.	C1362				CL W(CERRANS)	01461	16030	01563		
.	C1363				RJP U(INTERCOM)	01462	65020	63426		
.	C1364				U-TAG TELCCPERR*REPLYTOERR	01463	01525	01557		
.	C1365				ENT A*L(CERRANS)*AZERO	01464	11410	01563		
.	C1366				JP SICKOFCCP	01465	61000	01471		
.	C1367				ENT A*-2	01466	11040	77775		
.	C1370				RPL A+Y*L(CCPERROR)	01467	24010	01460		
.	C1371				JP A*	01470	61070	00000		BACK TO SAME
.	C1372	SICKOFCCP			SUB A*1*AZERO	01471	21400	00001		
.	C1373				JP PRESORT	01472	61000	00002		RESTART
.	C1374				JP FORCELCOMP	01473	61000	00343		NEW CHOICE
.	C1375	DPPMSG			FD 1*A	01474	06050	50505		
.	C1376				-0 $+1	01475	77777	01476		
.	C1377				FD 0*DATA PROCESSING PROGRAM..	01476	11063	10605		
						01477	25272	41012		
						01500	30301	62314		
						01501	05252	72414		
						01502	27062	27575		
.	C1400				403	01503	00000	00403		
.	C1401				FD 0*NONE(0) RADIOMETER(1) RADIOMETER SCAN(2) MERCURY EXP(3)	01504	23242	31251		
						01505	24400	52706		
						01506	11162	42212		
						01507	31122	75161		
						01510	40052	70611		
						01511	16242	21231		
						01512	12270	53010		
						01513	06235	16240		
						01514	05221	22710		
						01515	32273	50512		
						01516	35255	16340		
.	C1402				-0	01517	77777	77777		
.	C1403	DPPANS			FD 1*D	01520	11050	50505		
.	C1404				11 DPPCHOICE	01521	00011	01524		
.	C1405				0	01522	00000	00000		
.	C1406				3	01523	00000	00003		
.	C1407	DPPCHOICE			0	01524	00000	00000		
.	C1410	TELCCPERR			FD 1*A	01525	06050	50505		
.	C1411				-0 $+1	01526	77777	01527		
.	C1412				FD 6*THE SYSTEM IS AT AN IMPASSE...	01527	31151	20530		
						01530	36303	11222		
						01531	05163	00506		
						01532	31050	52305		
						01533	16222	50630		
						01534	30127	57575		
.	C1413				403	01535	00000	00403		
.	C1414				FD 6*(0) RE-ENTER CELESTIAL PROGRAM	01536	51244	00527		
						01537	12411	22331		
						01540	12270	51012		

CARDS	LI	ID LABEL	TA	STATEMENT	LOC	F JKB Y	NOTES
					01541	21123 03116	
					01542	06210 52527	
					01543	24142 70622	
.	C1415		403		01544	00000 00403	
.	C1416		FD	5*(1) NEW CELESTIAL CHOICE	01545	51614 00523	
					01546	12340 51012	
					01547	21123 03116	
					01550	06210 51015	
					01551	24161 01205	
.	C1417		403		01552	00000 00403	
.	C1420		FD	3*(2) RESTART	01553	51624 00527	
					01554	12303 10627	
					01555	31050 50505	
.	C1421		-0		01556	77777 77777	
.	C1422	REPLYTOERR	FD	1*D	01557	11050 50505	
.	C1423		11	CERRANS	01560	00011 01563	
.	C1424		0		01561	00000 00000	
.	C1425		2		01562	00000 00002	
.	C1426	CERRANS	0		01563	00000 00000	
.	C1427	TELLABORT	FD	1*A	01564	06050 50505	
.	C1430		-0	$+1	01565	77777 01566	
.	C1431		FD	0*CATASTROPHIC ERROR....ABORTING.	01566	10063 10630	
					01567	31272 42515	
					01570	16100 51227	
					01571	27242 77575	
					01572	75750 60724	
					01573	27311 62314	
					01574	75050 50505	
.	C1432		-0		01575	77777 77777	
.	C1433	COMPLOOP	ENTRY		01576	61000 00000	
.	C1434		PUT	12000*U(WHIMSY)	01577	10000 12000	
					01600	14020 01660	
.	C1435		ENT	A*U(RDXXX)*ANOT	01601	11520 53433	RA OEC OISPLAY PGM
.	C1436		JP	CX1	01602	61000 01605	
.	C1437		ENT	Q*W(FDRAOEC)	01603	10030 02533	PGM NAME
.	C1440		RJP	JUMPOFF	01604	65000 01652	COMMON JUMP POINT
.	C1441	CX1	PUT	W(WHIM)*W(WHIMSY)	01605	10030 01673	FOR CELESTIAL ERROR RETURN
					01606	14030 01660	
.	C1442		ENT	A*U(CELCOMPGM)*ANOT	01607	11520 53424	
.	C1443		JP	CX2	01610	61000 01613	
.	C1444		ENT	Q*W(CCPINCORE)	01611	10030 01372	
.	C1445		RJP	JUMPOFF	01612	65000 01652	
.	C1446	CX2	PUT	12000*U(WHIMSY)	01613	10000 12000	
					01614	14020 01660	
.	C1447		ENT	A*U(ADSCN)*ANOT	01615	11520 53416	
.	C1450		JP	CX3	01616	61000 01621	
.	C1451		ENT	Q*W(FDADSCN)	01617	10030 02542	
.	C1452		RJP	JUMPOFF	01620	65000 01652	
.	C1453	CX3	ENT	A*U(COCON)*ANOT	01621	11520 53414	
.	C1454		JP	CX4	01622	61000 01625	
.	C1455		ENT	Q*W(FDCOCON)	01623	10030 02524	
.	C1456		RJP	JUMPOFF	01624	65000 01652	

CARDS	LI	ID	LABEL	TA	STATEMENT	LOC	F	JKB	Y	NOTES
.	01457		CX4	ENT	A*U(AESCN)*ANOT	01625	11520	63417		
.	01460			JP	CX5	01626	61000	01631		
.	01461			ENT	Q*W(FOAESCN)	01627	10030	02527		
.	01462			RJP	JUMPOFF	01630	65000	01652		
.	01463		CX5	ENT	A*U(CORCT)*ANOT	01631	11520	63420		
.	01464			JP	CX6A	01632	61000	01635		
.	01465			ENT	Q*W(FOCORCT)	01633	10030	02526		
.	01466			RJP	JUMPOFF	01634	65000	01652		
.	01467		CX6A	ENT	A*U(ACQUI)*ANOT	01635	11520	63427		
.	01470			JP	CX6	01636	61000	01641		
.	01471			ENT	Q*W(FOACQUI)	01637	10030	02534		
.	01472			RJP	JUMPOFF	01640	65000	01652		
.	01473		CX6	ENT	A*U(INTER)*ANOT	01641	11520	63413		
.	01474			JP	CX7	01642	61000	01645		
.	01475			ENT	Q*W(FOINTER)	01643	10030	02525		
.	01476			RJP	JUMPOFF	01644	65000	01652		
.	01477		CX7	ENT	A*U(WFORD)*ANOT	01645	11520	63432		
.	01500			JP	CX8	01646	61000	01651		
.	01501			ENT	Q*W(FOWFORD)	01647	10030	02536		
.	01502			RJP	JUMPOFF	01650	65000	01652		
.	01503		CX8	EXIT		01651	61010	01576		
.	01504		JUMPOFF	ENTRY		01652	61000	00000		
.	01505			STR	Q*W(PGMNAME+B2)	01653	14032	01716		NAME OF PROGRAM
.	01506			STR	A*L(NOWGO)	01654	15010	01657		
.	01507			RJP	READCLOCK	01655	65000	01437		
.	01510			STR	A*W(TOUT+B2)	01656	15032	01747		BEGIN TIME THIS PGM
.	01511		NOWGO	RJP	0	01657	65000	00000		TO THE PGM FOR OPERATION
.	01512		WHIMSY	NO-OP		01660	12000	00000		ERROR FROM CELESTIAL PROGRAM
.	01513			RJP	READCLOCK	01661	65000	01437		
.	01514			STR	A*W(TRACK+B2)	01662	15032	02000		END TIME
.	01515			SUB	A*W(TOUT+B2)	01663	21032	01747		
.	01516			STR	A*W(TDIFF+B2)	01664	15032	02031		OPERATING TIME
.	01517			ENT	A*U(OYOMP)*ANOT	01665	11520	63421		
.	01520			JP	SHUTOFF	01666	61000	01671		
.	01521			ENT	Q*W(PGMNAME+B2)	01667	10032	01716		
.	01522			RJP	A*	01670	65070	00000		TO OYOJMP
.	01523		SHUTOFF	BSK	B2*77777	01671	71200	77777		
.	01524			EXIT		01672	61010	01652		
.	01525		WHIM	RJP	ERRANS	01673	65000	01674		
.	01526		ERRANS	ENTRY		01674	61000	00000		
.	01527			JP	ABORTIT*AZERO	01675	60400	01711		
.	01530			NO-OP		01676	12000	00000		
.	01531			STR	B0*CPW(KYBROLEVEL)	01677	16070	63110		DONT USE KEYBOARD
.	01532			STR	B0*CPL(SYSTAT1)	01700	16050	63313		INDICATE NOT IN BUFFER LOOP
.	01533			ENT	Q*W(CELTIME)	01701	10030	63133		DAYS B28
.	01534			MUL	4320000000	01702	22030	04155		ZOOMS PER DAY B0
.	01535			LSH	AQ*2	01703	07000	00002		B30
.	01536			STR	A*W(BLASTOFF)	01704	15030	63146		
.	01537			RJP	L(CELCOMPGM)	01705	65010	63424		REINIT SATEL FOR MORE DATA
.	01540			RJP	CCPERROR	01706	65000	01460		
.	01541			CL	L(SYSTAT1)	01707	16010	63313		
.	01542			EXIT		01710	61010	01674		
.	01543		ABORTIT	TERM	AZCHAN*OUTPUT	01711	67540	00000		

CARDS	LI	ID	LABEL	TA	STATEMENT	LOC	F JKB Y	NOTES
.	C1544				TERM TAPE*OUTPUT	01712	67640 00000	
.	C1545				RJP U(INTERCOM)	01713	65020 53426	
.	C1546				U-TAG TELLABORT*0	01714	01564 00000	
.	C1547				JP PRESORT	01715	61000 00002	
.	C1550		PGMNAME		RESERVE 250	01716	00000 00000	
.	C1551		TOUT		RESERVE 250	01747	00000 00000	
.	C1552		TRACK		RESERVE 250	02000	00000 00000	
.	C1553		TDIFF		RESERVE 250	02031	00000 00000	
.	C1554		WTLPSWDPP		0	02062	00000 00000	DPP SWITCH SET IN WAIT LOOP
.	C1555		AZBUFSWDPP		0	02063	00000 00000	DPP SWITCH SET IN AZ BUF CHAIN
.	C1556		AZBUFINTRP		ENTRY	02064	61000 00000	AZIMUTH BUFFER EMPTY
.	C1557				STR A*W(ASAVE)	02065	15030 02277	THIS IS AN INTERRUPT ENTRY POI NT
.	C1560				STR Q*W(QSAVE)	02066	14030 02300	SAVE ALL OPERATIONAL REGISTERS
.	C1561				STR B1*U(SAVE12)	02067	16120 02301	
.	C1562				STR B2*L(SAVE12)	02070	16210 02301	
.	C1563				STR B3*U(SAVE34)	02071	16320 02302	
.	C1564				STR B4*L(SAVE34)	02072	16410 02302	
.	C1565				STR B5*U(SAVE56)	02073	16520 02303	
.	C1566				STR B6*L(SAVE56)	02074	16610 02303	
.	C1567				STR B7*U(SAVE7)	02075	16720 02304	
.	C1570				CL L(SYSTAT1)	02076	16010 53313	IN THE BUFFER LOOP
.	C1571				STR B0*CPW(AZBUFSWDPP)	02077	16070 02063	
.	C1572				ENT B2*L(MAINSWITCH)	02100	12210 53334	ALTERNATOR
.	C1573				ENT A*W(SWINAZ+B2)	02101	11032 02252	
.	C1574				STR A*W(INAZIMADD)	02102	15030 53446	INPUT AZIMUTH BUFFER
.	C1575				PUT W(SWINEL+B2)*W(INELEVADD)	02103	10032 02254	INPUT ELEVATION
						02104	14030 53447	
.	C1576				PUT W(SWOUTAZ+B2)*W(AZIMADD)	02105	10032 02256	OUTPUT AZIMUTH
						02106	14030 53442	
.	C1577				PUT W(SWOUTEL+B2)*W(ELEVADD)	02107	10032 02260	OUTPUT ELEVATION
						02110	14030 53443	
.	C1600				PUT W(SWOUTDOPP+B2)*W(DOPPADD)	02111	10032 02262	OUTPUT DOPPLER
						02112	14030 53444	
.	C1601				PUT W(SWOUTRNGE+B2)*W(RANGEADD)	02113	10032 02264	OUTPUT RANGE
						02114	14030 53445	
.	C1602				PUT W(SWWFDATA+B2)*W(WFADD)	02115	10032 02617	
						02116	14030 53450	
.	C1603				PUT W(SWMSDATA+B2)*W(MILLSTNADD)	02117	10032 02623	
						02120	14030 53451	
.	C1604				PUT W(BCWWFORD+B2)*W(2)	02121	10032 02621	E.S.I.
						02122	14030 00002	
.	C1605				PUT W(BCWMS+B2)*W(1)	02123	10032 02625	E.S.I.
						02124	14030 00001	
.	C1606				ENT A*W(RECORDSIZE)*ANEG	02125	11730 53112	SYS IS HI SPO SIM IF NEG
.	C1607				JP $+3	02126	61000 02131	
.	C1610				OUT AZCHAN*W(BCWOUTAZ+B2)	02127	74572 02272	
.	C1611				JP $+2	02130	61000 02132	
.	C1612				OUT AZCHAN*W(BCWOUTAZ+B2)*MONITOR	02131	76572 02272	
.	C1613				NO-OP	02132	12000 00000	
.	C1614				OUT ELCHAN*W(BCWOUTEL+B2)	02133	74532 02274	
.	C1615				NO-OP	02134	12000 00000	

CARDS	LI ID	LABEL	TA	STATEMENT	LOC	F JKB Y	NOTES
.	C1616		IN	AZCHAN*W(BCWINAZ+B2)	02135	73572 02266	
.	C1617		NO-OP		02136	12000 00000	
.	C162C		IN	ELCHAN*W(BCWINEL+B2)*MONITOR	02137	75532 02270	
.	C1621		NO-OP		02140	12000 00000	
.	C1622		OUT	INTERSITE*W(BCWMS+B2)	02141	74632 02625	
.	C1623	COMPALT	ENT	A*1	02142	11000 00001	
.	C1624		RSF	CP*L(MAINSWITCH)	02143	55010 53334	SET ALTERNATOR TO REVERSE(0 OR 1)
.	C1625		RJP	READCLOCK	02144	65000 01437	
.	C1626		STR	A*W(SYNCTIMING)	02145	15030 53542	TIMING PROGRAM WILL CHECK THIS
.	C1627		ENT	A*U(PLOTP)*ANOT	02146	11520 53435	
.	C163C		JP	$+2	02147	61000 02151	
.	C1631		RJP	A	02150	65070 00000	
.	C1632		RTL		02151	50000 00000	SWITCHING COMPLETE
.	C1633		ENT	A*U(TIMEP)*ANOT	02152	11520 53435	
.	C1634		JP	DONTMOVE	02153	61000 02162	
.	C1635		RJP	U(TIMEP)	02154	65020 53435	
.	C1636		ENT	A*L(SYSCOMREG3)*AZERO	02155	11410 53454	
.	C1637		RJP	A	02156	65070 00000	
.	C164C		NO-OP		02157	12000 00000	
.	C1641		NO-OP		02160	12000 00000	
.	C1642		NO-OP		02161	12000 00000	
.	C1643	DONTMOVE	CL	B2*	02162	12200 00000	
.	C1644		PUT	12000*U(WHIMSY)	02163	10000 12000	
					02164	14020 01660	
.	C1645	TOCOMPLOOP	RJP	COMPLOOP	02165	65000 01575	
.	C1646		NO-OP		02166	12000 00000	SET UP RECORDING PARAMETERS
.	C1647		ENT	A*L(OOPPADD)	02167	11010 53444	SAVE FIRST DOPPLER JUST COMPUTED
.	C165C		STR	A*L($+1)	02170	15010 02171	
.	C1651		PUT	W(0)*W(TWOSECOOP)	02171	10030 00000	
					02172	14030 53017	
.	C1652		ENT	A*L(MAINSWITCH)*AZERO	02173	11410 53334	
.	C1653		JP	LEAVIT	02174	61000 02201	
.	C1654		ENT	B6*ADDROIFF	02175	12600 06000	
.	C1655		CL	Q*	02176	10000 00000	
.	C1656		RPT	NMOVES*ADVR	02177	70500 01000	
.	C1657		RPL	Y+0*W(IO1CELCOR)	02200	34030 53000	
.	C166C	LEAVIT	ENT	B1*L(MAINSWITCH)	02201	12110 53334	
.	C1661		CL	Q*	02202	10000 00000	
.	C1662		ENT	A*L(RECRDSWTCH)*ANOT	02203	11510 53155	
.	C1663		JP	FULLRECORD	02204	61000 02211	0 = RECORD ALL
.	C1664		SUF	A*1*ANOT	02205	21500 00001	
.	C1665		PUT	W(SHORTOUT+B1)*W(RECFILE+2+B1)	02206	10031 02246	1 = SHORT RECORDS
					02207	14031 53214	
.	C1666		JP	TORECORDNG	02210	61000 02213	
.	C1667	FULLRECORD	PUT	W(RITEOUT+B1)*W(RECFILE+2+B1)	02211	10031 02250	
					02212	14031 53214	
.	C167C	TORECORDNG	ENT	A*U(RECRD)*ANOT	02213	11520 53415	
.	C1671		JP	PLANMAYBE	02214	61000 02217	
.	C1672		ENT	Q*W(FDREGRD)	02215	10030 02523	
.	C1673		RJP	JUMPOFF	02216	65000 01652	
.	C1674	PLANMAYBE	ENT	A*W(TIMEMODE)*ANEG	02217	11730 53103	SKIP PLAN UNLESS SIM. MODE

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CARDS    LI ID LABEL      TA STATEMENT                                  LOC    F JKB Y      NOTES

   .     C1675            JP   JUSTANOOP                               02220  61000 02225
   .     C1676            ENT  A*U(PLANP)*ANOT                         02221  11520 53434
   .     C1677            JP   JUSTANOOP                               02222  61000 02225
   .     C1700            ENT  Q*W(FDPLANP)                            02223  10030 02537
   .     C1701            RJP  JUMPOFF                                 02224  65000 01652
   .     C1702 JUSTANOOP  NO-OP                                        02225  12000 00000
   .     C1703            ENT  A*UX(SYSCOMREG2)*APOS                   02226  11560 53453
   .     C1704            JP   NWLOOP                                  02227  61000 00767
   .     C1705            ENT  A*W(WTLPSWOPP)*ANOT                     02230  11530 02062
   .     C1706            JP   RSTORALL                                02231  61000 02234
   .     C1707            RJP  L(INTERCOM)                             02232  65010 53426
   .     C1710            RJP  ATTENTION                               02233  65000 00043
   .     C1711 RSTORALL   ENT  A*W(ASAVE)                              02234  11030 02277
   .     C1712            ENT  Q*W(QSAVE)                              02235  10030 02300
   .     C1713            ENT  B1*U(SAVE12)                            02236  12120 02301
   .     C1714            ENT  B2*L(SAVE12)                            02237  12210 02301
   .     C1715            ENT  B3*U(SAVE34)                            02240  12320 02302
   .     C1716            ENT  B4*L(SAVE34)                            02241  12410 02302
   .     C1717            ENT  B5*U(SAVE56)                            02242  12520 02303
   .     C1720            ENT  B6*L(SAVE56)                            02243  12610 02303
   .     C1721            ENT  B7*U(SAVE7)                             02244  12720 02304
   .     C1722            RILJP     L(AZBUFINTRP)                      02245  60110 02064  BACK TO PROGRAM INTERRUPTED BY
                                                                                            OUT AZ INT
   .     C1723 SHORTOUT   U-TAG     MCPFILLER+150*MCPFILLER            02246  71150 71000
   .     C1724            U-TAG     IDICELCOR+150*IDICELCOR            02247  63150 63000
   .     C1725 BITEOUT    U-TAG     INTERRANGE*MCPFILLER               02250  76777 71000
   .     C1726            U-TAG     RANGEOUT*IDICELCOR                 02251  70777 63000
   .     C1727 SWINAZ     U-TAG     AZIMIN*RECAZIM                     02252  75000 67000  PICK UP IF MAINSWITCH IS 0
   .     C1730            U-TAG     RECAZIM*AZIMIN                     02253  67000 75000  IS 1
   .     C1731 SWINEL     U-TAG     ELEVIN*RECELEV                     02254  76000 70000
   .     C1732            U-TAG     RECELEV*ELEVIN                     02255  70000 76000
   .     C1733 SWOUTAZ    U-TAG     AZIMOUT*INTERAZIM                  02256  64000 72000
   .     C1734            U-TAG     INTERAZIM*AZIMOUT                  02257  72000 64000
   .     C1735 SWOUTEL    U-TAG     ELEVOUT*INTERELEV                  02260  65000 73000
   .     C1736            U-TAG     INTERELEV*ELEVOUT                  02261  73000 65000
   .     C1737 SWOUTOPP   U-TAG     OOPPOUT*INTEROOPP                  02262  66000 74000
   .     C1740            U-TAG     INTEROOPP*OOPPOUT                  02263  74000 66000
   .     C1741 SWOUTRNGE  U-TAG     RANGEOUT*INTERRANGE                02264  70777 76777
   .     C1742            U-TAG     INTERRANGE*RANGEOUT                02265  76777 70777
   .     C1743 RCWINAZ    U-TAG     AZIMIN+4990*AZIMIN                 02266  75763 75000
   .     C1744            U-TAG     RECAZIM+4990*RECAZIM               02267  67763 67000
   .     C1745 RCWINEL    U-TAG     ELEVIN+4990*ELEVIN                 02270  76763 76000
   .     C1746            U-TAG     RECELEV+4990*RECELEV               02271  70763 70000
   .     C1747 RCWOUTAZ   U-TAG     AZIMOUT+4990*AZIMOUT               02272  64763 64000
   .     C1750            U-TAG     INTERAZIM+4990*INTERAZIM           02273  72763 72000
   .     C1751 RCWOUTEL   U-TAG     ELEVOUT+4990*ELEVOUT               02274  65763 65000
   .     C1752            U-TAG     INTERELEV+4990*INTERELEV           02275  73763 73000
   .     C1753 DUM200     0                                            02276  00000 00000
   .     C1754 ASAVE      0                                            02277  00000 00000
   .     C1755 QSAVE      0                                            02300  00000 00000
   .     C1756 SAVE12     0                                            02301  00000 00000
   .     C1757 SAVE34     0                                            02302  00000 00000
   .     C1760 SAVE56     0                                            02303  00000 00000
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CARDS    LI ID LABEL       TA STATEMENT                                    LOC    F JKB Y      NOTES
   .     C1761 SAVE7       0                                               02304  00000 00000
   .     C1762 ATTMSG      FD   1*A                                         02305  06050 50505
   .     C1763             -0   ATTMSG1                                    02306  77777 02307
   .     C1764 ATTMSG1     FD   0*SIGN OFF(1) MOD(2) NEXT RUN(3) PR02307  30161 42305
                           INT(4)
                                                                           02310  24131 35161
                                                                           02311  40052 22411
                                                                           02312  51624 00523
                                                                           02313  12353 10527
                                                                           02314  32235 16340
                                                                           02315  05252 71623
                                                                           02316  31516 44005
   .     C1765             -0   -0                                         02317  77777 77777
   .     C1766 REPLY1      FD   1*D                                         02320  11050 50505
   .     C1767             11   ANS1                                       02321  00011 02324  STORE REPLY IN ANS1 , LIMIT CH
                                                                                               ECK 1-3
   .     C1770 LWRLIMIT    0                                               02322  00000 00000
   .     C1771             0    4                                          02323  00000 00004  NEW UPPER LIMIT FOR ATTENTION
                                                                                               QUESTION
   .     C1772 ANS1        0    0                                          02324  00000 00000
   .     C1773 NAMEMSG     FD   1*A                                         02325  06050 50505
   .     C1774             -0   NAMEMSG1                                   02326  77777 02327
   .     C1775 NAMEMSG1    FD   0*TITLE                                     02327  31163 12112
   .     C1776             -0   -0                                         02330  77777 77777
   .     C1777 REPLY2      FD   1*M75                                       02331  22676 50505
   .     C2000             1    EXPNAME                                    02332  00001 53350  CR  LF  THEN NAME
   .     C2001 FREQMSG     FD   1*A                                         02333  06050 50505
   .     C2002             -0   FREQMSG1                                   02334  77777 02335
   .     C2003 FREQMSG1    FD   0*FREQ (MCS)                               02335  13271 22605
                                                                           02336  51221 03040
   .     C2004             -0   -0                                         02337  77777 77777
   .     C2005 REPLY6      FD   1*X14                                       02340  35616 40505
   .     C2006             11   FREQUENCY                                  02341  00011 53317
   .     C2007             0764000000                                      02342  07640 00000  DEC       8000.814          LW
                                                                                               R FREQ LMT
   .     C2010             1356000000                                      02343  13560 00000  DEC       12000.814         UP
                                                                                               R FREQ LMT
   .     C2011 CELPGMMSG   FD   1*A                                         02344  06050 50505
   .     C2012             -0   CELPGMMSG1                                 02345  77777 02346
   .     C2013 CELPGMMSG1  FD   100*BELT(1) SAT(2) AZ-EL(3) SUN(4) 02346   07122 13151
                           STAR(5) PLANET(6) M
                                                                           02347  61400 53006
                                                                           02350  31516 24005
                                                                           02351  06374 11221
                                                                           02352  51534 00530
                                                                           02353  32235 16440
                                                                           02354  05303 10627
                                                                           02355  51654 00525
                                                                           02356  21062 31231
                                                                           02357  51664 00522
   .     C2014             FD   0*DON(7) RA-DEC(8)                         02360  24242 35167
                                                                           02361  40052 70641
                                                                           02362  11121 05170
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SPURT OUTPUT NO. 210
MCP JDO*6/1/65

CARDS	LI	ID	LABEL	TA	STATEMENT	LOC	F	JKB	Y	NOTES
						02363	40050	50505		
.	C2015			-0	-0	02364	77777	77777		
.	C2016		REPLY7	FD	1*D	02365	11050	50505		
.	C2017			11	CELCHOICE	02366	00011	02371		
.	C2020			0	1	02367	00000	00001		
.	C2021			0	8D	02370	00000	00010		
.	C2022		CELCHOICE	0	3	02371	00000	00003		
.	C2023		DPPGMCODE	FD	1*RDMTR	02372	27112	23127		
.	C2024			FD	1*PDMTR	02373	25112	23127		
.	C2025			FD	1*MERC1	02374	22122	71061		
.	C2026		CELPGMCODE	FD	1*BELTP	02375	07122	13125		
.	02027			FD	1*SATEL	02376	30063	11221		
.	C2030			FD	1*FXANE	02377	13350	62312		
.	C2031			FD	1*SUNPG	02400	30322	32514		
.	C2032			FD	1*STARP	02401	30310	62725		
.	02033			FD	1*PLNET	02402	25212	31231		
.	C2034			FD	1*MOONP	02403	22242	42325		
.	C2035			FD	1*FRADC	02404	13270	61110		
.	C2036		SEARCHKEY	0	0	02405	00000	00000		FOR FINOING CEL PGMS ON TAPE
.	C2037		NICETABLE	FD	1*BELT	02406	07122	13105		
.	C2040			FD	1*SAT	02407	30063	10505		
.	C2041			FD	1*AZ-EL	02410	06374	11221		
.	C2042			FD	1*SUN	02411	30322	30505		
.	C2043			FD	1*STAR	02412	30310	62705		
.	C2044			FD	1*PLNET	02413	25212	31231		
.	C2045			FD	1*MOON	02414	22242	42305		
.	02046			FD	1*FRADC	02415	13270	51110		
.	C2047		CELPGMSTAT	0	1	02416	00000	00001		PARALLEL CELPGMCODE TABLE
.	C2050			0	2	02417	00000	00002		U +0 ER, L=CELPGM NUMBER
.	C2051			0	3	02420	00000	00003		
.	C2052			-0	4	02421	77777	00004		
.	C2053			-0	5	02422	77777	00005		
.	C2054			-0	6	02423	77777	00006		
.	C2055			0	7	02424	00000	00007		FIX MOON TO ER
.	C2056			0	8D	02425	00000	00010		
.	C2057		AOBI	RJP	AZBUFINTRP	02426	65000	02064		
.	C2060		NEWINSTR	JP	FIRSTENTRY	02427	61000	00035		
.	C2061		FFRED	0744800000		02430	07443	00000	DEC	7750.814
.	02062		HENRY	0000324304		02431	00003	24304	OEC	.00040509828
.	C2063		MODMSG1	FD	1*A	02432	06050	50505		
.	C2064			-0	$+1	02433	77777	02434		
.	C2065		NICEMSG	FD	11D* (1) OATA PROCESSING(2) SCA	02434	05050	50505		
					N(3) RECORDING(4) TIMING					
						02435	51614	00511		
						02436	06310	60525		
						02437	27241	01230		
						02440	30162	31451		
						02441	62400	53010		
						02442	06235	16340		
						02443	05271	21024		
						02444	27111	62314		
						02445	51644	00531		

CARDS	LI ID	LABEL	TA	STATEMENT	LOC	F JKB Y	NOTES
					02446	16221 52314	
.	C2066		FD	0*(5) OTHER(6)	02447	51654 00524	
					02450	31151 22751	
					02451	66400 50505	
.	C2067		-0		02452	77777 77777	
.	C2070	MODANS1	FD	1*C	02453	11050 50505	
.	C2071		11	MODCHOICE1	02454	00011 02457	
.	C2072		0	1	02455	00000 00001	LIMITS FOR MOO QUEST 1
.	C2073		0	6	02456	00000 00006	SIX CHOICES
.	C2074	MODCHOICE1	0		02457	00000 00000	
.	C2075	MODMSG2	FD	1*A	02460	06050 50505	
.	C2076		-0	$+1	02461	77777 02462	
.	C2077		FD	10D*RA-DEC DISPLAY(1) CORRECTION(2) PARAMETERS(3) ACQU	02462	27064 11112	
					02463	10051 11630	
					02464	25210 53651	
					02465	61400 51024	
					02466	27271 21031	
					02467	16242 35162	
					02470	40052 50627	
					02471	06221 23112	
					02472	27305 16340	
					02473	05061 02632	
.	C2100		FD	2*ISITION(4)	02474	16301 63116	
					02475	24235 16440	
.	C2101		403		02476	00000 00403	
.	C2102		FD	0*CC(5) COMP(6) PLOT(7)	02477	10105 16540	
					02500	05113 51122	
					02501	25516 54005	
					02502	25212 43151	
					02503	67400 50505	
.	C2103		-0		02504	77777 77777	
.	C2104	MODANS2	FD	1*0	02505	11050 50505	
.	C2105		11	MODCHOICE2	02506	00011 02511	
.	C2106		0	1	02507	00000 00001	
.	C2107		0	7	02510	00000 00007	
.	C2110	MODCHOICE2	0		02511	00000 00000	
.	C2111	RTREINIT	0	1	02512	00000 00001	BELT
.	C2112		0	2	02513	00000 00002	SAT
.	C2113		0	3	02514	00000 00003	FXANE
.	C2114		-0	4	02515	77777 00004	
.	C2115		-0	5	02516	77777 00005	
.	C2116		-0	6	02517	77777 00006	
.	C2117		-0	7	02520	77777 00007	
.	C2120		0	8D	02521	00000 00010	
.	C2121	ICNAMTAB	FD	1*KYBRD	02522	20360 72711	
.	C2122	FDRECRD	FD	1*RECRD	02523	27121 02711	
.	C2123	FDCOCON	FD	1*COCON	02524	10241 02423	
.	C2124	FDINTER	FD	1*INTER	02525	16233 11227	
.	C2125	FDCORCT	FD	1*CORCT	02526	10242 71031	
.	C2126	FDAESCN	FD	1*AESCN	02527	06123 01023	
.	C2127	FDDYDMP	FD	1*DYDMP	02530	11361 12225	
.	C2130	FDCHCOR	FD	1*CHCOR	02531	10151 02427	

CARDS	LI	ID	LABEL	TA	STATEMENT	LOC	F	JKB	Y	NOTES
.	C2131		FDPRLOG	FO	1*PRLOG	02532	25272	12414		
.	C2132		FDRADEC	FO	1*RADEC	02533	27061	11210		
.	C2133		FDACQUI	FO	1*ACQUI	02534	06102	53215		
.	C2134		FDCHPAR	FO	1*CHPAR	02535	10152	50627		
.	C2135		FDWFORD	FO	1*WFORD	02536	34132	42711		
.	C2136		FDPLANP	FO	1*PLANP	02537	25210	52325		
.	C2137		FDTIMEP	FO	1*TIMEP	02540	31162	21225		
.	C214C		FDPLOTP	FO	1*PLOTP	02541	25212	43125		
.	C2141		FDADSCN	FO	1*ADSCN	02542	06113	01023		
.	C2142		ICLOCTAB	0	INTERCOM	02543	00000	63426		
.	C2143			0	RECRO	02544	00000	53415		
.	C2144			0	COCON	02545	00000	53414		
.	C2145			0	INTER	02546	00000	53413		
.	C2146			0	CORCT	02547	00000	53420		
.	C2147			0	AESCN	02550	00000	53417		
.	C215C			0	OYOMP	02651	00000	53421		
.	C2151			0	CHCOR	02552	00000	53422		
.	C2152			0	PRLOG	02553	00000	63423		
.	C2153			0	ROXXX	02554	00000	53433		
.	C2154			0	ACQUI	02555	00000	53427		
.	C2155			0	CHPAR	02556	00000	53431		
.	C2156			0	WFORO	02557	00000	63432		
.	C2157			0	PLANP	02560	00000	53434		
.	C2160			0	TIMEP	02561	00000	53435		
.	C2161			0	PLOTP	02562	00000	53436		
.	C2162			0	ADSCN	02563	00000	53416		
.	C2163		HOWANY	0		02564	00000	00000		
.	C2164		SVRDXXX	0		02565	00000	00000		
.	C2165		FORMSFREQ	0120740000		02566	01207	40000	OEC	1295.814
.	C2166		FORWEFREQ	0744300000		02567	07443	00000	OEC	7750.814
.	C2167		HSLAT	0252374411		02570	02523	74411	OEC	42.6233820
.	C2170		HSLONG	2202027110		02571	22020	27110	OEC	288.5113820
.	C2171		LIGHTVEL	0000474123		02572	00004	74123	OEC	161875.80 N. M. PER SECONO
.	C2172		LSPAU	3714012172		02573	37140	12172	OEC	499.005820 LI GHT SECONOS PER A.U.
.	C2173		FLATT	0003345216		02574	00033	45216	OEC	.003367828 1/ 297
.	C2174		NMPAU	0464106362		02575	04641	06362	OEC	80776434.80 N. M. PER A.U.
.	C2175		AUPEQUAT	0664455306		02576	06644	55306	OEC	.4263561828 A. U. TIMES 10000 PER E
.	C2176		KMPNM	3550345300		02577	35503	45300	OEC	1.852828 KM . PER N.M.
.	C2177		EQUATVAL	3271763656		02600	32717	53656	OEC	3443.9525817
.	C22CC		POLEVAL	3264133241		02601	32641	33241	DEC	3432.3567817
.	C2201		HEIGHTVAL	0000000733		02602	00000	00733	OEC	475.80
.	C2202		SAVEOYOMP	0		02603	00000	00000		
.	C2203		OELTIME	0		02604	00000	00000		
.	C2204		FORA	JP	PREENTRA	02605	61000	01116		
.	C2205		ABSENT	FO	1*A	02606	06050	50505		
.	C2206			-0	ABSENTMSG	02607	77777	02610		
.	C2207		ABSENTMSG	FO	0* IS NOT IN MEMORY.	02610	05050	50505		

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CARDS    LI ID LABEL      TA STATEMENT                                  LOC    F JKB Y      NOTES

                                                                       02611  05163 00523
                                                                       02612  24310 51623
                                                                       02613  05221 22224
                                                                       02614  27367 50505
    .    C221C            -0                                         02615  77777 77777
    .    C2211 NOPGMS     0                                          02616  00000 00000
    .    C2212 SWWFDATA   U-TAG     WFOUT*WFINTER                    02617  02630 03056
    .    C2213            U-TAG     WFINTER*WFOUT                    02620  03056 02630
    .    C2214 PCWWFORD   U-TAG     WFOUT+1490*WFOUT                 02621  03055 02630
    .    C2215            U-TAG     WFINTER+1490*WFINTER             02622  03303 03056
    .    C2216 SWMSDATA   U-TAG     MSOUT*MSINTER                    02623  03304 03614
    .    C2217            U-TAG     MSINTER*MSOUT                    02624  03614 03304
    .    C2220 PCWMS      U-TAG     MSOUT+1990*MSOUT                 02625  03613 03304
    .    C2221            U-TAG     MSINTER+1990*MSINTER             02626  04123 03614
    .    C2222 PRINTKEY   FD   1*PRINT                               02627  25271 62331
    .    C2223 WFOUT      RESERVE   1500                             02630  00000 00000  TEN SPARES
    .    C2224 WFINTER    RESERVE   1500                             03056  00000 00000  TEN SPARES
    .    C2225 MSOUT      RESERVE   2000                             03304  00000 00000  40 POINTS PLUS 10 EXTRA
    .    C2226 MSINTER    RESERVE   2000                             03614  00000 00000  40 POINTS PLUS 10 EXTRA
    .    C2227 TIMEJP     RILJP     TIMESIN                          04124  60100 01445
    .    C2230 TIN        U-TAG     ACTUALTIME*ACTUALTIME            04125  63142 63142
    .    C2231 TEMP       RESERVE   5                                04126  00000 00000
    .    02232 DELAYTIME  0    10000D                                04133  00000 23420  EQUAL 2 SECONO IN 200 MS
    .    C2233 FORNEW     JP   NEWLOOP                               04134  61000 00210
    .    C2234 TSUBZERO   0                                          04135  00000 00000  PRESENT GMT PLUS OELAY TIME
    .    C2235 SECSNOW    0                                          04136  00000 00000
    .    C2236 MYSECONDS  0                                          04137  00000 00000
    .    C2237 PHOURS     0                                          04140  00000 00000
    .    C2240 PMINS      0                                          04141  00000 00000
    .    C2241 PREOUTAZ   U-TAG     INTERAZIM*INTERAZIM              04142  72000 72000
    .    02242 PREOUTEL   U-TAG     INTERELEV*INTERELEV              04143  73000 73000
    .    C2243 PREOUTWF   U-TAG     WFINTER+80*WFINTER               04144  03066 03056
    .    C2244 PREOUTMS   U-TAG     MSINTER+70*MSINTER               04145  03623 03614
    .    C2245 ANSDOPINT  RJP  SENOOPPLER                            04146  65000 01022
    .    C2246            RESERVE   1                                04147  00000 00000
                                                                       04150  30100 00002
                                                                       04151  24404 04040
                                                                       04152  00002 50600
                                                                       04153  01045 24200
                                                                       04154  00011 11740
                                                                       04155  31577 46000
                                                                       04156  30532 21600
                                                                       04157  20000 00000
                                                                       04160  40000 00000
                                                                       04161  05272 45200

END OF LISTING
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MCP J00*6/1/65

LABEL	LOC	LABEL	LOC	LABEL	LOC
A$$$$$1111	04150	A$$$$$1112	04151	A$$$$$1113	04152
A$$$$$1114	04153	A$$$$$1115	04154	A$$$$$1116	04155
A$$$$$1117	04156	A$$$$$1118	04157	A$$$$$1119	04160
A$$$$$111A	04161	AOBI	02426	ABORTIT	01711
ABSENT	02606	ABSENTMSG	02610	ACQAZIM	63D71
ACQELEV	63075	ACQUI	63427	ACTUALTIME	63142
ADDRDIFF	06000	AOSCN	63416	AEBOXLINES	63507
AESCN	63417	ALNGDFFSET	63517	ALNGACRSCN	63506
ANS1	02324	ANSODPINT	04146	ANSREW1	00D16
ANSREW2	01323	ANTMONITOR	00073	ARCOFAZIM	63524
ARCOFDEC	63526	ARCOFELEV	63522	ARCOFRA	63530
ARSV	01054	ASAVE	02277	ASTROOEC	63106
ASTRORA	63105	ATLEAST2	00636	ATTENTION	00043
ATTMSG	02305	ATTMSG1	02307	AUPEQUAT	D2576
AUPEREQUAT	63341	AZBUFINTRP	02064	AZBUFSWOPP	02063
AZDIFS	63120	AZELOTIME	63532	AZELBXSCAN	63500
AZIM	63053	AZIMOFFSET	63512	AZIMOUT	64000
AZIMOVER	63325	AZIMAOD	63442	AZIMIN	75000
AZMTHSCAN	63501	BODYSIZE	63462	B3SV	01050
BCWOUTAZ	02272	BCWOUTEL	02274	BCWINAZ	02266
BCWINEL	02270	BCWMS	D2625	BCWWFORO	02621
BLOCKIN	01276	BLASTOFF	63146	BREAKIN	00462
BREAKIN2	00646	BUILDUP	00631	COCON	63414
COMPALT	02142	COMPLOOP	D1576	CONVERTIME	63135
CORCT	63420	COSORIENT	63065	COSAZEL	63070
CALLMOOFY	00127	CALLNEWRUN	00332	CALLSTOP	00113
CANMOVE	00773	CAZIM	63060	CCPERROR	01460
CCPINCORE	D1372	CELBODY	63113	CELCOMPGM	63424
CELCHOICE	02371	CELEV	63061	CELPGMCODE	02375
CELPGMMSG	02344	CELPGMMSG1	02346	CELPGMSTAT	D2416
CELTIME	63133	CERRANS	01563	CHCOR	63422
CHECKOPP	01003	CHECKNWOAY	00216	CHPAR	63431
CRANGE	63057	CRSSOFFSET	63516	CSERROR	01346
CSUMMSG	01350	CX1	01605	CX2	D1613
CX3	01621	CX4	01625	CX5	D1631
CX6	01641	CX6A	01635	CX7	01645
CX8	01651	CYCLEPT	01036	DONTMOVE	02162
DOPPOUT	66000	DOPPADD	63444	DATANALYZE	63425
DAY	63150	DEC	63003	DECOFFSET	63515
DECOUT	63010	DECLINSCAN	63505	DELAYTIME	04133
DELTATEE	63316	DELTIME	02604	DPPANS	01520
DPPCHOICE	01524	DPPGMCODE	02372	DPPINCORE	01373
DPPMSG	01474	DSECONDS	63141	DUM200	02276
DUMMYIN	01416	DUMSECTTG	63154	DYOMP	63421
ELDIFS	63121	ELEV	63054	ELEVOFFSET	63513
ELEVOUT	65000	ELEVADD	63443	ELEVIN	76000
ELVTNSCAN	63502	ENDISABLE	01000	ENTRYSORT	01056
EQUATOR	63323	EQUATVAL	02600	ERRORRET	01414
ERRANS	01674	ESTSHIFTED	63143	EXPNAME	63350
FORA	02605	FORCELCOMP	00343	FORCKSUM	01330
FORASFREQ	02566	FORNEW	04134	FORPRINT	00057

SPURT OUTPUT NO. 211

MCP JDD*6/1/65

LABEL	LOC	LABEL	LOC	LABEL	LOC
FORWFREQ	02567	FDACQUI	02534	FDADSCN	02542
FDAESCN	02527	FDCOCON	02524	FDCORCT	02526
FDCHCOR	02531	FDCHPAR	02535	FDDYDMP	02530
FDINTER	02525	FDPLOTP	02541	FDPLANP	02537
FDPRLDG	02532	FDRADEC	02533	FDRECRD	02523
FDTIMEP	02540	FDWFORD	02536	FFREQ	02430
FIRSTFLEV	63104	FIRSTFNTRY	00035	FIRSTHRU	63153
FLATT	02574	FLATTENING	63337	FRAMESIZE	63101
FREQMSG	02333	FREQMSG1	02335	FREQUENCY	63317
FULLRECORD	02211	GOAGAIN	01277	GOTOPRLOG	01247
GOTOWF	00404	GEOCENLAT	63322	GEODETLAT	63321
GETALONG	00735	GMTMODU24	63145	GMTSHIFTED	63144
GXAGAIN	01403	HOLDNOHOLD	63511	HOURMINUTE	63137
HOURREG	63151	HOWANY	02564	HEIGHT	63326
HEIGHTVAL	02602	HENRY	02431	HSD	01053
HSLONG	02571	HSLAT	02570	ICLOCTAB	02543
ICNAMTAB	02522	ID10RADIO	66777	ID11RADIO	67776
ID12RADIO	67777	ID13RADIO	70775	ID14RADIO	70776
ID15RADIO	71776	ID16RADIO	71777	ID17RADIO	72776
ID18RADIO	72777	ID19RADIO	73776	ID1CELCOR	63000
ID1ENTPNT	63410	ID1RADCOR	63050	ID1RADIO	63440
ID1RECRD	63210	ID1SYSENT	77576	ID1SYSNAM	77676
ID1SYSPAR	63310	ID1TIME	63130	ID20RADIO	73777
ID21RADIO	74776	ID22RADIO	74777	ID23RADIO	75776
ID24RADIO	75777	ID25RADIO	76775	ID26RADIO	76776
ID2CELCOR	63001	ID2ENTPNT	63411	ID2RADCOR	63051
ID2RADIO	63441	ID2RECRD	63211	ID2SYSENT	77577
ID2SYSNAM	77677	ID2SYSPAR	63311	ID2TIME	63131
ID3RADIO	63776	ID4RADIO	63777	ID5RADIO	64776
ID6RADIO	64777	ID7RADIO	65776	ID8RADIO	65777
ID9RADIO	66776	INAZIMADD	63446	INCYCLE	00701
INELEVADD	63447	INITDPP	00561	INITIALCP	00506
INITIALIZE	00703	INSERT	00037	INSERTA	01120
INTER	63413	INTERAZIM	72000	INTERCOM	63426
INTERDOPP	74000	INTERFLEV	73000	INTERLCKSW	63460
INTERRANGE	76777	ITSIN	01126	JPANSREW1	01423
JPANSREW2	01424	JPFMSRCH	01415	JUMPOFF	01652
JUSTANODP	02225	KMPERNM	63342	KMPNM	02577
KYBRDLEVEL	63110	LOOKSRCH	01316	LOOPER	01076
LONGITUDE	63320	LEAVIT	02201	LIFTOFF	00762
LIGHTVEL	02572	LSPAU	02573	LSPERAU	63336
LWRLIMIT	02322	MODOTHER	00256	MODACQUI	00312
MODANS1	02453	MODANS2	02505	MODCOR	00306
MODCC	00276	MODCEL	00170	MODCELPGM	00175
MODCHOICE1	02457	MODCHOICE2	02511	MODDD	00302
MODDPP	00164	MODMSG1	02432	MODMSG2	02460
MODPARA	00316	MODPLOT	00322	MODRADEC	00272
MODRECRD	00153	MODSCAN	00142	MODTIME	00160
MAINSWITCH	63334	MCP	00000	MCPFILLER	71000
MCPGM	63412	MILLSTNADD	63451	MINREG	63152
MSOUT	03304	MSFREQ	63332	MSINTER	03614

..... SPURT OUTPUT NO. 211 .....

MCP JDO*6/1/65

LABEL	LOC	LABEL	LOC	LABEL	LOC
MUSTSETUP	01205	MUSTSTOP	00200	MYSECONDS	04137
NODPP	00564	NOPGMS	02616	NOWGO	01657
NOXING	00230	NAMEMSG	02325	NAMEMSG1	02327
NEWINSTR	02427	NEWINTLACE	00067	NEWLOOP	00210
NICEMSG	02434	NICETABLE	02406	NMOVES	01000
NMPAU	02575	NMPERAU	63340	NWORDS	00763
NWLOOP	00767	NXTOP	01133	POLE	63324
POLEVAL	02601	PERIODAZIM	63523	PERIODDEC	63525
PERIODELEV	63521	PERIODRA	63527	PGMNAME	01716
PHOURS	04140	PLOTP	63436	PLANMAYBE	02217
PLANP	63434	PMINS	04141	PREOUTAZ	04142
PREOUTEL	04143	PREOUTMS	04145	PREOUTWF	04144
PREENTRA	01116	PRESORT	00002	PRESETTTG	00536
PREVIOUSTM	63461	PRINREGSW	63160	PRINTKEY	02627
PRLOG	63423	QRSV	01055	QSAVE	02300
RA	63002	RAOFFSET	63514	RADOT	63007
RADARMODE	63312	RADCBXSCAN	63503	RADECOTIME	63531
RADIOOEC	63541	RADIOMETER	63102	RADIORA	63540
RADINOIC	63157	RADIUS	63006	RADIUSDOT	63011
RANGE	63052	RANGEOUT	70777	RANGEADD	63445
RANGEDOT	63062	RASCTNSCAN	63504	RDOTDIFS	63123
RDBOXLINES	63510	RDIFS	63122	RDMTR	63430
RDXXX	63433	READOK	01374	READCLOCK	01437
RECORDSIZE	63112	RECAZIM	67000	RECELEV	70000
RECFILE	63212	RECRO	63415	RECRDSWTCH	63155
REINITCP	00253	RELEASESW	63156	RENEW	00213
REPLY1	02320	REPLY2	02331	REPLY6	02340
REPLY7	02365	REPLYTOERR	01557	REWSYS	01422
RITEOUT	02250	RPTSUM	01337	RSTORALL	02234
RTREINIT	02512	SORRY	01435	SORRYMSG	01425
SAVE12	02301	SAVE34	02302	SAVE56	02303
SAVE7	02304	SAVEDYDMP	02603	SAYOUT	01107
SAYWHICH	01401	SAZIM	63055	SCELTIME	63134
SDEC	63005	SEARCHKEY	02405	SECONDS	63140
SECSNOW	04136	SELEV	63056	SENDOPPLER	01022
SETADRS	01131	SETCOM	01101	SETPICKUP	01130
SETRPT	01100	SETTOGO	00573	SETUPSRCH	01064
SHORTOUT	02246	SHUTOFF	01671	SICKOFCCP	01471
SIDERTIME	63012	SIMU	00461	SINORIENT	63064
SINAZEL	63066	SITNORMAL	00423	SKIP	63331
SLAVE	63126	SLAVEOPTS	63124	SLAVEMODES	63125
SRA	63004	SRADTIME	63136	SRCHWI	01417
STOPSCAN	00025	STARTHERE	01340	STATUS	01421
SVRDXXX	02565	SWOUTAZ	02256	SWOUTDOPP	02262
SWOUTEL	02260	SWOUTRNGE	02264	SWINAZ	02252
SWINEL	02254	SWMSDATA	02623	SWWFDATA	02617
SYNCTIMING	63542	SYSCOMREG1	63452	SYSCOMREG2	63453
SYSCOMREG3	63454	SYSCOMREG4	63455	SYSCOMREG5	63456
SYSCOMREG6	63457	SYSENTRIES	77600	SYSISSIM	01015
SYSNAMES	77700	SYSTAT1	63313	SYSTAT2	63314
SYSTATD	63315	TOOLATE	00604	TOCOMPLOOP	02165

..... SPURT OUTPUT NO. 211 .....

MCP JOD*6/1/65

LABEL	LOC	LABEL	LOC	LABEL	LOC
TORECORONG	02213	TOTOPS	01275	TOUT	01747
TRACK	02000	TOIFF	02031	TELCCPERR	01525
TELLABORT	01564	TELLXED	01356	TEMP	04126
TESTLP	01104	TIMECORR	63107	TIMEJP	04124
TIMEMODE	63103	TIMEP	63435	TIMESIN	01445
TIMETOHOLD	63520	TIN	04125	TRUERANGE	63063
TRUETIME	63132	TSUBZERO	04135	TTYSTATUS	63111
TWOSECOOP	63017	UNITNO	00001	VELOFLIGHT	63335
VIZDEC1	63014	VIZDEC2	63016	VIZRA1	63013
VIZRA2	63015	WATCHTIME	00740	WFORO	63432
WFOUT	0263D	WFADO	63450	WFFREQ	63333
WFINTER	03056	WHCHCLSPGM	01377	WHEREIS	01420
WHICHANS	00052	WHICHMOD1	00133	WHICHM002	00262
WHIM	01673	WHIMSY	01660	WLRETURN	00325
WTLPSWOPP	02062	YEARMONTH	63147	YRTRAN	63327
ZRTRAN	6333D				

END OF LISTING

..... SPURT OUTPUT NO. 212 .....

MCP J00*6/1/65

LABEL	LOC	LABEL	LOC	LABEL	LOC
MCP	00000	UNITNO	00001	PRESORT	00002
ANSREW1	00016	STOPSCAN	00025	FIRSTENTRY	00035
INSERT	00037	ATTENTION	00043	WHICHANS	00052
FORPRINT	00057	NEWINTLACE	00067	ANTMONITOR	00073
CALLSTOP	00113	CALLMODFY	00127	WHICHM001	00133
MODSCAN	00142	MOORECRO	00153	MODTIME	00160
MODDPP	00164	MOOCEL	00170	MODCELPGM	00175
MUSTSTOP	00200	NEWLOOP	00210	RENEW	00213
CHECKNWOAY	00216	NOXING	00230	REINITCP	00253
MODOTHER	00256	WHICHM002	00262	MOORAOEC	00272
MODCC	00276	M0000	00302	MODCOR	00306
MODACQUI	00312	MOOPARA	00316	MODPLOT	00322
WLRETURN	00325	CALLNEWRUN	00332	FORCELCOMP	00343
GOTOWF	00404	SITNORMAL	00423	SIMU	00461
BREAKIN	00462	INITIALCP	00506	PRESETTTG	00536
INITDPP	00561	NOOPP	00564	SETTOGO	00573
TOOLATE	00604	BUILDUP	00631	ATLEAST2	00636
BREAKIN2	00646	INCYCLE	00701	INITIALIZE	00703
GETALONG	00735	WATCHTIME	00740	LIFTOFF	00762
NWORDS	00763	NWLOOP	00767	CANMOVE	00773
NMOVES	01000	ENOISABLE	01000	CHECKDPP	01003
SYSISSIM	01015	SENDOPPLER	01022	CYCLEPT	01036
B3SV	01050	HSO	01053	ARSV	01054
QRSV	01055	ENTRYSORT	01056	SETUPSRCH	01064
LOOPER	01076	SETRPT	01100	SETCOM	01101
TESTLP	01104	SAYOUT	01107	PREENTRA	01116
INSERTA	01120	ITSIN	01126	SETPICKUP	01130
SETADRS	01131	NXTOP	01133	MUSTSETUP	01205
GOTOPRLOG	01247	TOTOPS	01275	BLOCKIN	01276
GOAGAIN	01277	LOOKSRCH	01316	ANSREW2	01323
FORCKSUM	01330	RPTSUM	01337	STARTHERE	01340
CSERROR	01346	CSUMMSG	01350	TELLXEO	01356
CCPINCORE	01372	OPPINCORE	01373	REAOOK	01374
WHCHCLSPGM	01377	SAYWHICH	01401	GXAGAIN	01403
ERRORRET	01414	JPFMSRCH	01415	OUMMYIN	01416
SRCHWI	01417	WHEREIS	01420	STATUS	01421
REWSYS	01422	JPANSREW1	01423	JPANSREW2	01424
SORRYMSG	01425	SORRY	01435	READCLOCK	01437
TIMESIN	01445	CCPERROR	01460	SICKOFCCP	01471
OPPMSG	01474	OPPANS	01520	OPPCHOICE	01524
TELCCPERR	01525	REPLYTOERR	01557	CERRANS	01563
TELLABORT	01564	CDMPLOOP	01576	CX1	01605
CX2	01613	CX3	01621	CX4	01625
CX5	01631	CX6A	01635	CX6	01641
CX7	01645	CX8	01651	JUMPOFF	01652
NOWGO	01657	WHIMSY	01660	SHUTOFF	01671
WHIM	01673	ERRANS	01674	ABORTIT	01711
PGMNAME	01716	TOUT	01747	TBACK	02000
TOIFF	02031	WTLPSWOPP	02062	AZBUFSWOPP	02063
AZBUFINTRP	02064	COMPALT	02142	ODNTMOVE	02162
TOCOMPLOOP	02165	LEAVIT	02201	FULLRECORO	02211

..... SPURT OUTPUT NO. 212 .....

MCP JDO*6/1/65

LABEL	LOC	LABEL	LOC	LABEL	LOC
TORECORONG	02213	PLANMAYBE	02217	JUSTANOOP	02225
RSTORALL	02234	SHORTOUT	02246	RITEOUT	02250
SWINAZ	02252	SWINEL	02254	SWOUTAZ	02256
SWOUTEL	02260	SWOUTDOPP	02262	SWOUTRNGE	02264
BCWINAZ	02266	BCWINEL	02270	BCWOUTAZ	02272
BCWOUTEL	02274	DUM200	02276	ASAVE	02277
QSAVE	02300	SAVE12	02301	SAVE34	02302
SAVE56	02303	SAVE7	02304	ATTMSG	02305
ATTMSG1	02307	REPLY1	02320	LWRLIMIT	02322
ANS1	02324	NAMEMSG	02325	NAMEMSG1	02327
REPLY2	02331	FREQMSG	02333	FREQMSG1	02335
REPLY6	02340	CELPGMMSG	02344	CELPGMMSG1	02346
REPLY7	02365	CELCHOICE	02371	DPPGMCODE	02372
CELPGMCODE	02375	SEARCHKEY	02405	NICETABLE	02406
CELPGMSTAT	02416	AOBI	02426	NEWINSTR	02427
FFREQ	02430	HENRY	02431	MOOMSG1	02432
NICEMSG	02434	MODANS1	02453	MODCHOICE1	02457
MODMSG2	02460	MODANS2	02505	MOOCHOICE2	02511
RTREINIT	02512	ICNAMTAB	02522	FDRECRD	02523
FDCOCON	02524	FOINTER	02525	FDCORCT	02526
FDAESCN	02527	FODYOMP	02530	FOCHCOR	02531
FOPRLOG	02532	FDRAOEC	02533	FDACQUI	02534
FDCHPAR	02535	FDWFORO	02536	FOPLANP	02537
FDTIMEP	02540	FDPLOTP	02541	FDADSCN	02542
ICLOCTAB	02543	HOWANY	02564	SVRDXXX	02565
FORMSFREQ	02566	FORWFFREQ	02567	HSLAT	02570
HSLONG	02571	LIGHTVEL	02572	LSPAU	02573
FLATT	02574	NMPAU	02575	AUPEQUAT	02576
KMPNM	02577	EQUATVAL	02600	POLEVAL	02601
HEIGHTVAL	02602	SAVEOYOMP	02603	DELTIME	02604
FORA	02605	ABSENT	02606	ABSENTMSG	02610
NOPGMS	02616	SWWFOATA	02617	BCWWFORD	02621
SWMSDATA	02623	BCWMS	02625	PRINTKEY	02627
WFOUT	02630	WFINTER	03056	MSOUT	03304
MSINTER	03614	TIMEJP	04124	TIN	04125
TEMP	04126	DELAYTIME	04133	FORNEW	04134
TSUBZERO	04135	SECSNOW	04136	MYSECONDS	04137
PHOURS	04140	PMINS	04141	PREOUTAZ	04142
PREOUTEL	04143	PREOUTWF	04144	PREOUTMS	04145
ANSOOPINT	04146	A$$$$$1111	04150	A$$$$$1112	04151
A$$$$$1113	04152	A$$$$$1114	04153	A$$$$$1115	04154
A$$$$$1116	04155	A$$$$$1117	04156	A$$$$$1118	04157
A$$$$$1119	04160	A$$$$$111A	04161	ADDRDIFF	06000
IO1CELCOR	63000	IO2CELCOR	63001	RA	63002
DEC	63003	SRA	63004	SDEC	63005
RADIUS	63006	RAOOT	63007	DECDOT	63010
RAOIUSDOT	63011	SIOERTIME	63012	VIZRA1	63013
VIZDEC1	63014	VIZRA2	63015	VIZDEC2	63016
TWOSECDOP	63017	ID1RADCOR	63050	ID2RADCOR	63051
RANGE	63052	AZIM	63053	ELEV	63054
SAZIM	63055	SELEV	63056	CRANGE	63057

..... SPURT OUTPUT NO. 212 .....

MCP JDD•6/1/65

LABEL	LOC	LABEL	LOC	LABEL	LOC
CAZIM	63060	CELEV	63061	RANGEDOT	63062
TRUERANGE	63063	SINORIENT	63064	COSORIENT	63065
SINAZEL	63066	COSAZEL	63070	ACQAZIM	63071
ACQELEV	63075	FRAMESIZE	63101	RADIDMETER	631D2
TIMEMODE	63103	FIRSTELEV	63104	ASTRORA	631D5
ASTROOEC	63106	TIMECORR	63107	KYBRDLEVEL	63110
TTYSTATUS	63111	RECORDSIZE	63112	CELBODY	63113
AZDIFS	63120	ELDIFS	63121	RDIFS	63122
ROOTDIFS	63123	SLAVEOPTS	63124	SLAVEMODES	63125
SLAVE	63126	ID1TIME	63130	ID2TIME	63131
TRUETIME	63132	CELTIME	63133	SCELTIME	63134
CONVERTIME	63135	SRAOTIME	63136	HOURMINUTE	63137
SECONDS	63140	DSECONDS	63141	ACTUALTIME	63142
ESTSHIFTED	63143	GMTSHIFTED	63144	GMTMODU24	63145
BLASTOFF	63146	YEARMONTH	63147	DAY	63150
HOURREG	63151	MINREG	63152	FIRSTHRU	63153
DUMSECTTG	63154	RECRDSWTCH	63155	RELEASESW	63156
RADINOIC	63157	PRINRECSW	63160	ID1RECRD	63210
I02RECRD	63211	RECFILE	63212	I01SYSPAR	63310
I02SYSPAR	63311	RADARMODE	63312	SYSTAT1	63313
SYSTAT2	63314	SYSTATD	63315	DELTATEE	63316
FREQUENCY	63317	LONGITUDE	63320	GEODETLAT	63321
GEOCENLAT	63322	EQUATOR	63323	POLE	63324
AZIMOVER	63325	HEIGHT	63326	YRTRAN	63327
ZRTRAN	63330	SKIP	63331	MSFREQ	63332
WFFREQ	63333	MAINSWITCH	63334	VELOFLIGHT	63335
LSPERAU	63336	FLATTENING	63337	NMPERAU	63340
AUPEREQUAT	63341	KMPERNM	63342	EXPNAME	63350
ID1ENTPNT	6341D	ID2ENTPNT	63411	MCPGM	63412
INTER	63413	COCON	63414	RECRD	63415
ADSCN	63416	AESCN	63417	CORCT	63420
OYOMP	63421	CHCOR	63422	PRLOG	63423
CELCOMPGM	63424	DATANALYZE	63425	INTERCOM	63426
ACQUI	63427	RDMTR	63430	CHPAR	63431
WFORO	63432	RDXXX	63433	PLANP	63434
TIMEP	63435	PLOTP	63436	I01RAOIO	63440
ID2RAOIO	63441	AZIMADO	63442	ELEVADD	63443
DDPPADD	63444	RANGEADD	63445	INAZIMADD	63446
INELEVADD	63447	WFADD	63450	MILLSTNADD	63451
SYSCOMREG1	63452	SYSCOMREG2	63453	SYSCOMREG3	63454
SYSCOMREG4	63455	SYSCOMREG5	63456	SYSCOMREG6	63457
INTERLCKSW	63460	PREVIOUSTM	63461	BODYSIZE	63462
AZELBXSCAN	63500	AZMTHSCAN	63501	ELVTNSCAN	63502
RADCBXSCAN	63503	RASCTNSCAN	63504	DECLINSCAN	63505
ALNGACRSCN	63506	AERDXLINES	63507	RDBOXLINES	63510
HOLDNOHOLD	63511	AZIMOFFSET	63512	ELEVOFFSET	63513
RADFFSET	63514	DECOFFSET	63515	CRSSOFFSET	63516
ALNGOFFSET	63517	TIMETOHOLD	63520	PERIODELEV	63521
ARCOFELEV	63522	PERIODAZIM	63523	ARCOFAZIM	63524
PERIODEC	63525	ARCOFOEC	63526	PERIODRA	63527
ARCOFRA	63530	RADECOTIME	63531	AZELOTIME	63532

..... SPURT OUTPUT NO. 212 .....

MCP JDD*6/1/65

LABEL	LOC	LABEL	LOC	LABEL	LOC
RADIDRA	63540	RAOIODEC	63541	SYNCTIMING	63542
ID3RAOID	63776	ID4RAOID	63777	AZIMOUT	64000
ID5RADID	64776	ID6RAOID	64777	ELEVOUT	65000
ID7RAOID	65776	ID8RAOID	65777	OOPPOUT	66000
ID9RAOID	66776	ID10RAOID	66777	RECAZIM	67000
ID11RAOID	67776	ID12RAOID	67777	RECELEV	70000
ID13RADID	70775	ID14RADID	70776	RANGEOUT	70777
MCPFILLER	71000	ID15RAOID	71776	I016RAOID	71777
INTERAZIM	72000	ID17RADID	72776	I018RAOID	72777
INTERELEV	73000	ID19RADID	73776	I020RAOID	73777
INTERDOPP	74000	ID21RAOID	74776	I022RAOID	74777
AZIMIN	75000	I023RAOID	75776	I024RAOID	75777
ELEVIN	76000	I025RAOID	76775	I026RAOID	76776
INTERRANGE	76777	I01SYSENT	77676	I02SYSENT	77577
SYSENTRIES	77600	I01SYSNAM	77676	I02SYSNAM	77677
SYSNAMES	77700				

END OF LISTING

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CARDS    LI ID LABEL      TA STATEMENT                          LOC    F JKB Y      NOTES

   .     C00CC TIMING         PROGRAM   JOD*4/21/65
   .     C0C01 TAPE           MEANS     C15
   .     C0002 INTERSITE      MEANS     C14
   .     C0003 AZCHAN         MEANS     C13
   .     C0004 ELCHAN         MEANS     C12
   .     C0005 DOPPCHAN       MEANS     C11
   .     C0006 RANGECHAN      MEANS     C10
   .     C0007 RTCLOCK        MEANS     C7
   .     C001C SPARE1         MEANS     C6
   .     C0011 DATACHAN       MEANS     C5
   .     C0012 PAPERTAPE      MEANS     C4
   .     C0013 HSPRINTER      MEANS     C3
   .     C0014 CONSOLE        MEANS     C2
   .     C0015 SPARE2         MEANS     C1
   .     C0016 FX2            MEANS     C0
   .     C0017 TIMING         U-TAG     TMRUN*TMINIT          00000  00347 00002
   .     C0020                FD    )*TIMEP                 00001  31162 21225
   .     C0021 TMINIT         ENTRY                         00002  61000 00000
   .     C0022                ENT   A*LX(SYSTAT1)*ANEG      00003  11750 53313  ARE WE CYCLING
   .     C0023                JP    ADJUSTTIME              00004  61000 00277  CHANGE TIME WHILE CYCLING
   .     C0024 NORMALINIT     ENT   A*W(FIRSTHRU)*AZERO     00005  11430 53153  NO INITIALIZING SYSTEM
   .     C0025                JP    FORHJF                  00006  61000 00013  NOT JUST BOOTSTRAPPED
   .     C0026 FORMONTH       RJP   U(INTERCOM)             00007  65020 53426  ASK FOR MONTH
   .     C0027                U-TAG     MNTHMSG*REPLY4      00010  00552 00662
   .     C0030 FORDAY         RJP   U(INTERCOM)             00011  65020 53426  ASK FOR DAY
   .     C0031                U-TAG     DAYMSG*REPLY5       00012  00667 00676
   .     C0032                COMMENT   NOW                                    CELTIME FOR HJF
   .     C0033 FORHJF         CL    W(TIMEMODE)             00013  16030 53103
   .     C0034                RJP   READCLOCK               00014  65000 00630
   .     C0035                PUT   6*LITIMES3)             00015  10000 00006  SET TIMING TO NORMAL
                                                            00016  14010 00245
   .     C0036                PUT   4*LIBACKTOREAL)         00017  10000 00004
                                                            0002C  14010 00352
   .     C0037                PUT   2*LI(NBUFRLOOP)         00021  10000 00002
                                                            00022  14010 00357
   .     C0040                PUT   61000*U(WATCHDOG)       00023  10000 61000
                                                            00024  14020 00545
   .     C0041                PUT   2*LIFRAMESIZE)          00025  10000 00002
                                                            00026  14010 53101
   .     C0042                ENT   0*2                     00027  10000 00002  INITIALIZE FRAME SIZE IN SECON
                                                                                 DS
   .     C0043                STR   Q*LI(NBUFRLOOP)         00030  14010 00357
   .     C0044                ENT   Q*W(GMTMODU24)          00031  10030 53145
   .     C0045                CL    A*                      00032  11000 00000
   .     C0046                DIV   50000                   00033  23000 11610  NO OF 200 MICROSECOND / SECOND
   .     C0047                SUB   A*25000*ANEG            00034  21700 04704
   .     C0050                ADD   Q*1                     00035  26000 00001
   .     C0051                STR   Q*W(TEMP+3)             00036  14030 00570
   .     C0052                ENT   A*W(TEMP+3)             00037  11030 00570
   .     C0053                CL    Q*                      00040  10000 00000
   .     C0054                RSH   A0*2                    00041  03000 00002
   .     C0055                DIV   864000                  00042  23030 01221
   .     C0056                STR   Q*W(TRUETIME)           00043  14030 53132
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CARDS    LI ID LABEL      TA STATEMENT                                LOC    F JKB Y      NOTES

   .     C0057            STR  Q*W(CELTIME)                          00044  14030 53133
   .     C0060            STR  Q*W(SCELTIME)                         00045  14030 53134
   .     C0061            STR  Q*W(CONVERTIME)                       00046  14030 53135
   .     C0062            STR  Q*W(SRADTIME)                         00047  14030 53136
   .     C0063 TIMENOW    CL   A*                                    00050  11000 00000  PRINT OUT GMT NOW (HHMM)
   .     C0064            ENT  Q*W(TEMP+3)                           00051  10030 00570  NO SECONDS NOW
   .     C0065            DIV  36000                                 00052  23000 07020
   .     C0066            STR  Q*L(PHOURS)                           00053  14010 00771
   .     C0067            STR  A*Q                                   00054  15000 00000
   .     C0070            CL   A*                                    00055  11000 00000
   .     C0071            DIV  600                                   00056  23000 00074
   .     C0072            SUB  A*300*ANEG                            00057  21700 00036
   .     C0073            ADD  Q*1                                   00060  26000 00001
   .     C0074            STR  Q*L(PMINS)                            00061  14010 00772
   .     C0075            ENT  A*60                                  00062  11000 00060
   .     C0076            RPT  4*AOV                                 00063  70100 00004
   .     C0077            STR  A*W(TEMP)                             00064  15030 00565
   .     C0100            CL   A*                                    00065  11000 00000
   .     C0101            ENT  Q*W(PHOURS)                           00066  10030 00771
   .     C0102            DIV  100                                   00067  23000 00012
   .     C0103            RPL  A+Y*L(TEMP+1)                         00070  24010 00566
   .     C0104            RPL  Y+Q*L(TEMP)                           00071  34010 00565
   .     C0105            CL   A*                                    00072  11000 00000
   .     C0106            ENT  Q*W(PMINS)                            00073  10030 00772
   .     C0107            DIV  100                                   00074  23000 00012
   .     C0110            RPL  A+Y*L(TEMP+3)                         00075  24010 00570
   .     C0111            RPL  Y+Q*L(TEMP+2)                         00076  34010 00567
   .     C0112            ENT  A*L(TEMP)                             00077  11010 00565
   .     C0113            LSH  A*6                                   00100  06000 00006
   .     C0114            ADD  A*L(TEMP+1)                           00101  20010 00566
   .     C0115            LSH  A*6                                   00102  06000 00006
   .     C0116            ADD  A*L(TEMP+2)                           00103  20010 00567
   .     C0117            LSH  A*6                                   00104  06000 00006
   .     C0120            ADD  A*L(TEMP+3)                           00105  20010 00570
   .     C0121            LSH  A*6                                   00106  06000 00006
   .     C0122            ADD  A*5                                   00107  20000 00005
   .     C0123            STR  A*W(PRSNTIME)                         00110  15030 00721
   .     C0124            RJP  U(INTERCOM)                           00111  65020 53426
   .     C0125            U-TAG      TIMEMSG*0                       00112  00717 00000
   .     C0126            ENT  A*W(PREVIOUSTM)                       00113  11030 53461
   .     C0127            PUT  W(GMTMODU24)*W(PREVIOUSTM)            00114  10030 53145
                                                                     00115  14030 53461
   .     C0130            SUB  A*W(GMTMODU24)*APOS                   00116  21630 53145
   .     C0131            JP   NOXING                                00117  61000 00123
   .     C0132            RPL  Y+1*L(DAYREG)                         00120  36010 00702
   .     C0133            RJP  U(INTERCOM)                           00121  65020 53426
   .     C0134            U-TAG      TELLXED*0                       00122  00332 00000
   .     C0135 NOXING     STR  BO*CPW(HOURREG)                       00123  16070 53151
   .     C0136            CL   W(RECOROSIZE)                         00124  16030 53112  SET TO LO SPO CYCLE
   .     C0137 ASKRUNTYPE CL   W(RUNTYPEANS)                         00125  16030 01041  SET C.R. ANS TO REAL TIME
   .     C0140            RJP  U(INTERCOM)                           00126  65020 53426  0=REAL TIME 1= SIMULATION
   .     C0141            U-TAG      RUNTYPEQ*RUNTYPEA               00127  01020 01035
   .     C0142            STR  BO*CPW(TIMEMODE)                      00130  16070 53103  SET SYSTEM MODE TO SIMULATED
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CARDS    LI IC LABEL      TA STATEMENT                                LOC    F JKB Y      NOTES

   .     C0143              ENT  A*L(RUNTYPEANS)*AZERO                00131  11410 01041
   .     C0144              JP   ISASIMRUN                            00132  61000 00144
   .     00145              CL   W(TIMEMODE)                          00133  16030 53103  SET SYSTEM TO REAL TIME
   .     C0146 ASKSTARTUP   CL   W(STARTUPANS)                        00134  16030 01065  SET C.R. ANS TO NOW
   .     C0147              RJP  U(INTERCOM)                          00135  65020 53426
   .     C015C              U-TAG     STARTUPQ*STARTUPA               00136  01042 01061  0=NOW  1= DELAYED
   .     C0151              ENT  A*L(STARTUPANS)*ANOT                 00137  11510 01065
   .     C0152              JP   NORMALTME                            00140  61000 00252  START NOW
   .     C0153              RJP  U(INTERCOM)                          00141  65020 53426  ASK WHAT REAL TIME TO START (H
                                                                                          HMM)
   .     C0154              U-TAG     REALKOQ*REALKOA                 00142  01066 01076
   .     C0155              JP   NORMALTME                            00143  61000 00252  TIME TO START IN HOURREG
   .     C0156 ISASIMRUN    ENT  A*W(FIRSTHRU)*ANEG                   00144  11730 53153
   .     C0157              JP   DONTASKIT                            00145  61000 00152
   .     C0160              RJP  U(INTERCOM)                          00146  65020 53426
   .     C0161              U-TAG     MNTHMSG*REPLY4                  00147  00652 00662
   .     C0162              RJP  U(INTERCOM)                          00150  65020 53426
   .     C0163              U-TAG     DAYMSG*REPLY5                   00151  00667 00676
   .     C0164 DONTASKIT    ENT  Q*12000                              00152  10000 12000
   .     C0165              STR  Q*U(WATCHDOG)                        00153  14020 00545  IGNORE CLOCK MONITOR
   .     C0166              CL   W(RECORDSIZE)                        00154  16030 53112  NORMAL RECORDS, 2 SEC.CYCLE TI
                                                                                          ME
   .     C0167              CL   W(OTVALUE)                           00155  16030 01165
   .     C017C STATORINCR   CL   W(MOTIONANS)                         00156  16030 01123  CR= 0 = INCREMENTED SIM TIME
   .     C0171              PJP  U(INTERCOM)                          00157  55020 53426
   .     C0172              U-TAG     MOTIONQ*MOTIONA                 00160  01102 01117  ASK IF INCREMETED OR STATIONAR
                                                                                          Y
   .     C0173              ENT  A*L(MOTIONANS)*AZERO                 00161  11410 01123
   .     C0174              JP   STANOSTILL                           00162  61000 00210
   .     C0175 FRSTINCRTM   RJP  U(INTERCOM)                          00163  65020 53426  INCR.   ASK FIRST SIMULATED GM
                                                                                          T (HHMMSS)
   .     C0176              U-TAG     FRSTSIMTMQ*FRSTSIMTMA           00164  01124 01137  ANSWER IN RAWTTG
   .     C0177 DELTATOGMT   RJP  U(INTERCOM)                          00165  65020 53425  ASK TIME INCREMENT IN SECONDS
   .     C02CC              U-TAG     ADDAMTQ*ADDAMTA                 00166  01143 01161  ANSWER IN DIVALUE
   .     C0201              PUT  77777*W(RUNLENGTH)                   00167  10000 77777
                                                                      00170  14030 00605
   .     C0202              RJP  U(INTERCOM)                          00171  65020 53426  ASK RUN DURATION
   .     C0203              U-TAG     RUNTIMEQ*RUNTIMEA               00172  00572 00601  ANS IN RUNLENGTH
   .     C0204              ENT  A*W(RUNLENGTH)                       00173  11030 00605  MAKE RUN LENGTH EVEN DAYS
   .     C0205              CL   Q*                                   00174  10000 00000
   .     C0206              RSH  AQ*1                                 00175  03000 00001
   .     C0207              LSH  A*1*OPOS                             00176  06200 00001
   .     C0210              ADD  A*2                                  00177  20000 00002
   .     C0211              STR  A*W(RUNLENGTH)                       00200  15030 00605
   .     C0212 COMPTRATE    CL   W(FASTORSLOW)                        00201  16030 01206  ASK OUTPUT RATE
   .     C0213              RJP  U(INTERCOM)                          00202  65020 53426  SET TO HI SPEED=0
   .     C0214              U-TAG     HOWFASTQ*HOWFASTA               00203  01155 01202
   .     C0215              ENT  A*W(FASTORSLOW)*AZERO                00204  11430 01206
   .     C0216              JP   NOTPLANING                           00205  61000 00215
   .     C0217              STR  80*CPW(RECORDSIZE)                   00206  16070 53112
   .     C0220              JP   NOTPLANING                           00207  61000 00215
   .     C0221 STANOSTILL   STR  80*CPW(RECORDSIZE)                   00210  16070 53112  STATIONARY MODE  SET O/P RATE
                                                                                          HIGH
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CARDS    LI ID LABEL       TA STATEMENT                                LOC    F JKB Y      NOTES

   .     C0222             CL   W(FRAMESIZE)                          00211  16030 53101
   .     C0223             CL   W(DTVALUE)                            00212  16030 01165
   .     C0224             RJP  U(INTERCOM)                           00213  65020 53426  ASK FIRST STATIONARY TIME(HHMM
                                                                                          SS)
   .     C0225 FRSTSTATIM  U-TAG     INITTMQ*FRSTSIMTMA               00214  01207 01137  ANSWER IN  RAWTTG
   .     C0226 NOTPLANING  PUT  L(DTVALUE)*L(INBUFRLOOP)              00215  10010 01165
                                                                      00216  14010 00357
   .     C0227             STR  Q*L(FRAMESIZE)                        00217  14010 53101
   .     C023C             LSH  Q*)                                   00220  05000 00001  2 X DT
   .     C0231             STR  Q*L(BACKTOREAL)                       00221  14010 00352
   .     C0232             ADD  Q*L(DTVALUE)                          00222  26010 01165  3 X DT
   .     C0233             STR  Q*L(TIMES3)                           00223  14010 00245
   .     C0234             ENT  Q*W(RAWTTG)                           00224  10030 00773
   .     C0235             CL   A*                                    00225  11000 00000
   .     C0236             DIV  )10000D                               00226  23000 23420
   .     C0237             STR  Q*W(DUMHRS)                           00227  14030 00774
   .     C024C             STR  A*Q                                   00230  15000 00000
   .     C0241             CL   A*                                    00231  11000 00000
   .     C0242             DIV  )100D                                 00232  23000 00144
   .     C0243             STR  Q*W(DUMMINS)                          00233  14030 00775
   .     C0244             STR  A*W(DUMSECS)                          00234  15030 00776
   .     C0245             ENT  Q*W(DUMHRS)                           00235  10030 00774
   .     C0246             MUL  3600D                                 00236  22000 07020
   .     C0247             STR  Q*W(DUMSECTTG)                        00237  14030 53154
   .     C025C             ENT  Q*W(DUMMINS)                          00240  10030 00775
   .     C0251             MUL  60D                                   00241  22000 00074
   .     C0252             RPL  Y+Q*W(DUMSECTTG)                      00242  34030 53154
   .     C0253             ENT  Q*W(DUMSECS)                          00243  10030 00776
   .     C0254             RPL  Y+Q*W(DUMSECTTG)                      00244  34030 53154
   .     C0255 TIMESS      SUB  A*6                                   00245  21000 00006
   .     C0256             STR  A*W(DUMSECTTG)                        00246  15030 53154
   .     C0257             ENT  Q*W(DUMSECTTG)                        00247  10030 53154  TIME TO GO IN SECONDS
   .     C0260             MUL  50000                                 00250  22000 11610
   .     C0261             STR  Q*W(DUM200TTG)                        00251  14030 00777  IN UNITS OF 200 MICROSECONDS

   .     C0262 NORMALTIME  CL   A*                                    00252  11000 00000
   .     C0263             ENT  Q*W(HOURREG)                          00253  10030 53151
   .     C0264             DIV  100D                                  00254  23000 00144
   .     C0265             STR  Q*W(HOURREG)                          00255  14030 53151
   .     C0266             STR  A*W(MINREG)                           00256  15030 53152
   .     C0267             COMMENT   NOW                                                 SET UP ALL TIME REGISTERS EXCE
                                                                                          PT CLOCK TIME
   .     C027C ESTABTIME   ENT  A*L(YEARREG)                          00257  11010 00651
   .     C0271             ADD  A*1900D                               00260  20000 03554
   .     C0272             STR  A*U(YEARMONTH)                        00261  15020 53147
   .     C0273             PUT  L(MNTHREG)*L(YEARMONTH)               00262  10010 00666
                                                                      00263  14010 53147
   .     C0274             PUT  L(DAYREG)*U(DAY)                      00264  10010 00702
                                                                      00265  14020 53150
   .     C0275             CL   Q*                                    00266  10000 00000
   .     C0276             ENT  A*L(MNTHREG)                          00267  11010 00666
   .     C0277             SUB  A*)*APOS                              00270  21600 00001
   .     C03CC             JP   ADDAY                                 00271  51000 00274
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CARDS    LI ID LABEL       TA STATEMENT                                LOC    F JKB Y      NOTES

.        C0301             RPT  A*AOV                                  00272  70170 00000
.        C0302             ADD  Q*L(MONTHTABLE1                        00273  26010 00703
.        C0303 ADDAY       ADD  Q*L(DAYREG1                            00274  26010 00702
.        C0304             STR  Q*L(DAY)                               00275  14010 53150  DAY OF THE YEAR
.        C0305             EXIT                                        00276  61010 00002
.        C0306 ADJUSTTIME  ENT  A*W(TIMEMODE1*ANEG                     00277  11730 53103
.        C0307             EXIT                                        00300  61010 00002  ADJUST ONLY IN SIM MODE FOR NO
                                                                                           W1
.        C0310             ENT  A*W(FRAMESIZE1*AZERO                   00301  11430 53101
.        C0311             EXIT                                        00302  61010 00002  AND THEN ONLY ON ZERO FRAME SI
                                                                                           ZE
.        C0312             RJP  U(INTERCOM1                            00303  65020 63426
.        C0313             U-TAG     NEWTMQUES*NEWTMANS                00304  00606 00622
.        C0314 NEXTTIME    CL   A*                                     00305  11000 00000
.        C0315             ENT  Q*W(NEWSGMT)                           00306  10030 00626
.        C0316             DIV  100000                                 00307  23000 23420
.        C0317             STR  Q*W(TEMP1                              00310  14030 00565
.        C0320             STR  A*Q                                    00311  15000 00000
.        C0321             CL   A*                                     00312  11000 00000
.        C0322             DIV  1000                                   00313  23000 00144
.        C0323             STR  Q*W(TEMP+11                            00314  14030 00566  MINS
.        C0324             STR  A*W(TEMP+2)                            00315  15030 00567  SEC
.        C0325             ENT  Q*W(TEMP)                              00316  10030 00565
.        C0326             MUL  36000                                  00317  22000 07020
.        C0327             STR  Q*W(TEMP+31                            00320  14030 00570
.        C0330             ENT  Q*W(TEMP+1)                            00321  10030 00566
.        C0331             MUL  600                                    00322  22000 00074
.        C0332             RPL  Y+Q*W(TEMP+31                          00323  34030 00570
.        C0333             ENT  Q*W(TEMP+21                            00324  10030 00567
.        C0334             RPL  Y+Q*W(TEMP+3)                          00325  34030 00570
.        C0335             STR  A*W(OSECONDS)                          00326  15030 53141
.        C0336             RJP  U(INTERCOM1                            00327  65020 63426
.        C0337             0    NEWTMANS                               00330  00000 00622
.        C0340             JP   NEXTTIME                               00331  61000 00305
.        C0341 TELLXED     FD   1*A                                    00332  06050 50505
.        C0342             -0   $+1                                    00333  77777 00334
.        C0343             FD   0*NEW DAY OF THE YEAR DETECTED ....    00334  23123 40511
                               NOW IN FORCE.
                                                                       00335  06360 52413
                                                                       00336  05311 51205
                                                                       00337  36120 62705
                                                                       00340  11123 11210
                                                                       00341  31121 10575
                                                                       00342  75757 50505
                                                                       00343  05232 43405
                                                                       00344  16230 51324
                                                                       00345  27101 27505
.        C0344             -0                                          00346  77777 77777
.        C0345 TMRUN       ENTRY                                       00347  61000 00000
.        C0346 B4INBUFLP   CL   Q*                                     00350  10000 00000
.        C0347             ENT  A*W(OSECONDS1                          00351  11030 53141
.        C0350 BACKTOREAL  SUB  A*4*APOS                               00352  21600 00004
.        C0351             CP   Q*                                     00353  14000 00000
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CARDS    LI ID LABEL       TA STATEMENT                                LOC    F JKB Y      NOTES

   .     C0352               RSH  AQ*2                                 00354  03000 00002
   .     C0353               OIV  864000                               00355  23030 01221
   .     C0354               STR  Q*W(TRUETIME)                        00356  14030 53132
   .     C0355 INBUFRLOOP    ENT  A*2                                  00357  11000 00002  UPOATE TIMES
   .     C0356               RPL  A+Y*W(OSECONDS)                      00360  24030 53141
   .     C0357               COM  A*W(MAXSECONOS)*YLESS                00361  04530 00762  ARE WE PAST TWO OAYS
   .     C0360               JP   STILLTIME                            00362  61000 00503  NO
   .     C0361               TERM AZCHAN*OUTPUT                        00363  67540 00000
   .     C0362               TERM ELCHAN*OUTPUT                        00364  67500 00000
   .     C0363               TERM OATACHAN*INPUT                       00365  66240 00000
   .     C0364               ENT  Q*W(TIMEMODE)*QPOS                   00366  10230 53103  ARE WE IN SIMULATEO MOOE
   .     C0365               JP   INOEXOAY                             00367  61000 00415  YES
   .     C0366 TIMEXCEED     RJP  U(INTERCOM)                          00370  65020 53426
   .     C0367               U-TAG     EXCEEOEOTM*O                    00371  00751 00000
   .     C0370               CL   W(KYBROLEVEL)                        00372  16030 53110  OK TO USE INTERCOM
   .     C0371               CL   W(REWANS)                            00373  16030 01017
   .     C0372               RJP  U(INTERCOM)                          00374  65020 53426  ASK IF EOF + REW O/P TAPE
   .     C0373               U-TAG     EOFREWQ*EOFREWA                 00375  01000 01013
   .     C0374               ENT  A*W(REWANS)*AZERO                    00376  11430 01017  SHALL WE OO IT
   .     C0375               JP   L(MCPGM)                             00377  61010 53412  NO
   .     C0376               STR  BO*CPW(SYSTATO)                      00400  16070 53315
   .     C0377               PUT  W(WHERTOGO)*W(35)                    00401  10030 00414  YES
                                                                       00402  14030 00035
   .     C0400               EX-FCT    TAPE*1230000004                 00403  13570 01222  EOF W/ INTERRJPT
   .     C0401               JP   $                                    00404  61000 00404
   .     C0402 FILEDONE      STR  TAPE*W(TEMP)                         00405  17570 00565
   .     C0403               PUT  BACKTOTOP*L(35)                      00406  10000 00412
                                                                       00407  14010 00035
   .     C0404               EX-FCT    TAPE*3010000004                 00410  13670 01223  REW W/ INTERRUPT·
   .     C0405               JP   $                                    00411  61000 00411
   .     C0406 BACKTOTOP     STR  TAPE*W(TEMP)                         00412  17570 00565
   .     C0407               JP   U(SYSCOMREG1)                        00413  61020 53452  TO MCP AND PRINT
   .     C0410 WHERTOGO      RILJP     FILEDONE                        00414  60100 00405
   .     C0411 INDEXDAY      SUB  A*W(MAXSECONOS)                      00415  21030 00762
   .     C0412               SUB  A*1                                  00416  21000 00001
   .     C0413               STR  A*W(OSECONOS)                        00417  15030 53141  DAY - 2(86400)
   .     C0414               ENT  A*W(RECOROSIZE)*AZERO                00420  11430 53112  HI SPO IF ANOT
   .     C0415               STR  BO*CPW(KYBROLEVEL)                   00421  16070 53110
   .     C0416               ENT  A*-2                                 00422  11040 77775
   .     C0417               RPL  A+Y*W(RUNLENGTH)*ANOT                00423  24530 00605
   .     C0420               JP   TIMEXCEEO                            00424  61000 00370
   .     C0421               ENT  A*2                                  00425  11000 00002
   .     C0422               RPL  A+Y*L(OAY)                           00426  24010 53150  INOEX OAY NUMBER
   .     C0423               CL   B3*                                  00427  12300 00000  PREPARE TO FINO MONTH AND OAY

   .     C0424 SUBMONTH      SUB  A*W(MONTHTABLE+B3)*APOS              00430  21533 00703
   .     C0425               JP   FIXMONTH                             00431  61000 00435
   .     C0426               BSK  B3*110                               00432  71300 00013
   .     C0427               JP   SUBMONTH                             00433  61000 00430
   .     C0430               JP   TIMEXCEEO                            00434  61000 00370
   .     C0431 FIXMONTH      ADD  A*W(MONTHTABLE+B3)                   00435  20033 00703
   .     C0432               STR  A*U(OAY)                             00436  15020 53150  OAY OF MONTH
   .     C0433               BSK  B3*77                                00437  71300 00077
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SPURT OUTPUT NO. 210
TIMING J00*4/21/65

CAROS	LI	IC	LABEL	TA	STATEMENT	LOC	F	JKB	Y	NOTES
.	C0434			STR	B3*L(YEARMONTH)	00440	16310	53147		MONTH
.	C0435			CL	W(CELTIME)	00441	16030	53133		
.	C0436			STR	B0*CPL1SYSTAT1)	00442	16050	53313		PUT IN NON-BUFFER MODE
.	C0437			CL	Q*	00443	10000	00000		
.	00440			ENT	A*W(FRAMESIZE)	00444	11030	53101		
.	C0441			RSH	AQ*2	00445	03000	00002		
.	C0442			01V	864000	00446	23030	01221		
.	C0443			RPL	Y+Q*W(TRUETIME)	00447	34030	53132		
.	C0444			JP	$*TAPE*ACTIVEOUT	00450	63640	00450		WAIT FOR RECORDING TO FINISH
.	C0445			RJP	L(COCON)	00451	65010	53414		INITIALIZE COORDINATE CONVERSI ON
.	C0446			NO-OP		00452	12000	00000		
.	C0447			RJP	L(CELCOMPGM)	00453	65010	53424		INITIALIZE CELESTIAL COMPUTATI ON
.	C045C			NO-OP		00454	12000	00000		
.	C0451			STR	B0*CPU(EXPNAME+15D)	00455	16060	53367		KEY FOR PRINTOUT
.	C0452			ENT	A*L(RECRO)*ANOT	00456	11510	53415		
.	C0453			JP	$+3	00457	61000	00462		
.	C0454			CL	A*	00460	11000	00000		
.	C0455			RJP	L(RECRD)	00461	65010	53415		
.	C0456			JP	$+1	00462	61000	00463		
.	00457			ENT	A*U1RECRO)*ANOT	00463	11520	53415		WRITE NEW HEADING
.	C046C			JP	$+2	00464	61000	00466		
.	C0461			RJP	A*	00465	65070	00000		
.	C0462			JP	$*TAPE*ACTIVEOUT	00466	63640	00466		
.	C0463			CL	U(EXPNAME+15D)	00467	16020	63367		
.	00464			CL	L1SYSTAT1)	00470	16010	53313		PUT IN BUFFER MODE
.	C0465			ENT	B3*L1MAINSWITCH)	00471	12310	53334		
.	00466			ENT	A*W(RECOROSIZE)*ANEG	00472	11730	53112		HI SPD IF ANEG
.	C0467			JP	$+3	00473	61000	00476		
.	C0470			OUT	AZCHAN*W(BCWOUTAZ+B3)	00474	74573	00501		
.	C0471			JP	$+2	00475	61000	00477		
.	C0472			OUT	AZCHAN*W(BCWOUTAZ+B3)*MONITOR	00476	76573	00501		INITIATE OUTPUT
.	C0473			ENT	A*W(OSECONOS)	00477	11030	63141		SECONDS OF DAY
.	C0474			JP	STILLTIME	00500	61000	00503		
.	C0475		BCWOUTAZ	U-TAG	INTERAZIM+4990*INTERAZIM	00501	72763	72000		
.	C0476			U-TAG	AZIMOUT+499D*AZIMOUT	00502	64763	54000		
.	C0477		STILLTIME	CL	Q*APOS	00503	10500	00000		
.	C05CC			CP	Q*	00504	14000	00000		
.	C0501			RSH	AQ*2	00505	03000	00002		
.	00502			01V	864000	00506	23030	01221		
.	C0503			STR	Q*W1CELTIME)	00507	14030	63133		
.	C0504			STR	Q*W1SCELTIME)	00510	14030	53134		
.	C0505			STR	Q*W1CONVERTIME)	00511	14030	53135		
.	C0506			STR	Q*W1SRAOTIME)	00512	14030	53136		
.	C0507			CL	A*	00513	11000	00000		
.	C051C			ENT	Q*W(DSECONOS)*QPOS	00514	10230	53141		
.	C0511			CP	A*	00515	15040	00000		
.	C0512			01V	36000	00516	23000	07020		
.	C0513			STR	Q*U1HOURMINUTE)	00517	14020	53137		
.	C0514			STR	A*Q	00520	15000	00000		
.	C0515			CL	A*QPOS	00521	11200	00000		
.	C0516			CP	A*	00522	15040	00000		

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CARDS    LI ID LABEL      TA STATEMENT                          LOC    F JKB Y      NOTES
   .     C0517            DIV  600                              00523  23000 00074
   .     C0520            STR  Q*L(HOURMINUTE)                  00524  14010 53137
   .     C0521            STR  A*U(SECONDS)                     00525  15020 53140
   .     C0522            CL   A*                               00526  11000 00000
   .     C0523            ENT  Q*W(SYNCTIMING)                  00527  10030 53542  GMTMOD 24 UNIT 200 MS B0
   .     C0524            LSH  AQ*11D                           00530  07000 00013  200MS B11
   .     00525            DIV  5000D                            00531  23000 11610  NO. OF 200 MS/SEC B0
   .     C0526            STR  Q*W(SECSNOW)                     00532  14030 00767  REAL TIME IN SECS B11
   .     00527            ENT  A*W(DSECONDS)                    00533  11030 53141  PROGRAM CLOCK SECONDS B0 (ABOU
                                                                                     T 6 SEC LATER)
   .     C0530            SUB  A*B6400D*APOS                    00534  21530 01221
   .     C0531            ADD  A*864000                         00535  20030 01221  NO
   .     C0532            LSH  A*11D                            00536  06000 00013  LINE UP WITH REAL TIME
   .     C0533            SUB  Q*A                              00537  27070 00000  REAL TIME- PROGRAM TIME = LESS
                                                                                      THAN-6 SEC
   .     00534            ADD  Q*W(SIXSECB11)                   00540  26030 00562  DIFF NOW SHOULD BE SMALL AND P
                                                                                     OSITIVE
   .     C0535            SUB  Q*W(DAYB11)*QPOS                 00541  27630 00563
   .     00536            ADD  Q*W(DAYB11)                      00542  26030 00563
   .     C0537            STR  Q*W(TIMEDELTA)                   00543  14030 00564
   .     C0540            SUB  Q*10*QNEG                        00544  27700 00010  EQUALS 3.906 MS  LSB = .488MS

   .     C0541 WATCHDOG   JP   TIMERROR                         00545  61000 00727
   .     C0542 TIMELOCKED ENT  Q*W(TRUERANGE)*QNEG              00546  10330 53063  ARE WE IN ASTRO UNITS
   .     C0543            JP   BACKTOMCP                        00547  61000 00560  NO ARE IN EARTH RADII
   .     C0544            ENT  A*U(INELEVADD)                   00550  11020 53447  RANGE TO CEL OBJ A.U. B24
   .     00545            STR  A*L($+1)                         00551  15010 00552  PICK UP INCOMING ELEVATION
   .     C0546            ENT  A*W(0)*ANEG                      00552  11730 00000  CHANGE IN CODING BIT 29 OF INC
                                                                                     OMING ELEV.
   .     C0547            EXIT                                  00553  61010 00347  NOW 0 IS NORMAL (RECIEVE) 1 IS
                                                                                      XMIT.
   .     C0550            CP   Q*                               00554  14000 00000  XMTING MODE, SAVE DISTANCE B24
                                                                                     (A.U.)
   .     C0551            MUL  W(DAYSPRAURT)                    00555  22030 00561  DAYS PER A.U. ROUND TRIP (B29)

   .     C0552            LSH  AQ*5                             00556  07000 00005  DAYS 53 THEN 5B = 28
   .     C0553            RPL  A+Y*W(CELTIME)                   00557  24030 53133  NEW TIME OF COMPUTATION B28

   .     00554 BACKTOMCP  EXIT                                  00560  61010 00347
   .     C0555 DAYSPRAURT 0027520111                            00561  00275 20111  DEC       .01155104829       49
                                                                                     9.005  LS PER A U (0
   .     C0556 SIXSECB11  0000030000                            00562  00000 30000  DEC       6.B11
   .     00557 DAYB11     1243000000                            00563  12430 00000  DEC       B6400.B11
   .     C0560 TIMEDELTA  0                                     00564  00000 00000
   .     C0561 TEMP       RESERVE   5                           00565  00000 00000
   .     C0562 RUNTIMEQ   FD   1*A                              00572  06050 50505
   .     C0563            -0   $+1                             00573  77777 00574
   .     C0564            FD   0*RUN DURATION IN DAYS           00574  27322 30511
                                                                00575  32270 53116
                                                                00576  24230 51623
                                                                00577  05110 53630
   .     C0565            -0                                    00600  77777 77777
   .     C0566 RUNTIMEA   FD   1*D                              00601  11050 50505
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CARDS	LI	ID	LABEL	TA	STATEMENT	LOC	F	JKB	Y	NOTES
.	C0567			11	RUNLENGTH	00602	00011	00605		
.	C057C			1		00603	00000	00001		
.	C0571			3777777777		00604	37777	77777		
.	C0572		RUNLENGTH	0		00605	00000	00000		
.	C0573		NEWTMQUES	FD	1*A	00606	06050	50505		
.	C0574			-D	$+1	00607	77777	00610		
.	C0575			FD	0*ENTER (AT WILL) NEW SIMULATED GMT (HHMMSS)	00610	12233	11227		
						00611	05510	53105		
						00612	34162	12140		
						00613	05231	23405		
						00614	30162	23221		
						00615	06311	21105		
						00616	14223	10551		
						00617	15152	22230		
						00620	30400	50505		
.	C0576			-D		00621	77777	77777		
.	C0577		NEWTMANS	FD	1*D	00622	11050	50505		
.	C0600			11	NEWSGMT	00623	00011	00626		
.	C0601			0		00624	00000	00000		
.	C0602			4759580		00625	00016	41466		
.	C0603		NEWSGMT	0		00626	00000	00000		
.	C0604		DELTIME	0		00627	00000	00000		
.	C0605		READCLOCK	ENTRY		00630	61000	00000		
.	C0606			PUT	W(TIMEJP)*W(47)	00631	10030	00763		CLOCK ON CHAN 7
						00632	14030	00047		
.	C0607			IN	RTCLOCK*W(TIN)*MONITOR	00633	75370	00764		
.	C061C			RIL		00634	60000	00000		
.	C0611			JP	$	00635	61000	00635		
.	C0612		TIMESIN	ENT	A*W(ACTUALTIME)	00636	11030	53142		
.	C0613			RSH	A*1	00637	02000	00001		PUT HI ORDER TIME BIT IN BIT POSITION 27
.	C0614			SEL	CL*4000000000	00640	52030	01224		ELIMINATE SIGN BIT
.	C0615			STR	A*W(ESTSHIFTED)	00641	15030	53143		
.	C0616			ADD	A*900000000	00642	20030	01225		5 HOURS IN UNITS OF 200 MICROSECONDS
.	C0617			AOD	A*W(DELTIME)	00643	20030	00627		AOJUST THE CLOCK
.	C0620			STR	A*W(GMTSHIFTED)	00644	15030	53144		MAY EXCEED 24 HOURS
.	C0621			SUB	A*4320000000*APDS	00645	21530	01226		24 HOURS OF 200 MICROSECONDS
.	C0622			ADD	A*4320000000	00646	20030	01226		
.	C0623			STR	A*W(GMTMODU24)	00647	15030	53145		MODULO 24 HOURS
.	C0624			EXIT		00650	61010	00630		
.	C0625		YEARREG	D	65D	00651	00000	00101		1965
.	C0626		MNTHMSG	FD	1*A	00652	06050	50505		
.	C0627			-D	MNTHMSG1	00653	77777	00654		
.	C0630		MNTHMSG1	FD	0*GREENWICH MONTH(1-12)	00654	14271	21223		
						00655	34161	01505		
						00656	22242	33115		
						00657	51514	16162		
						00660	40050	50505		
.	C0631			-D	-0	00661	77777	77777		
.	C0632		REPLY4	FD	1*D	00662	11050	50505		
.	C0633			11	MNTHREG	00663	00011	00666		

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CARDS    L1 IC LABEL      TA STATEMENT                                  LOC    F JKB Y      NOTES

   .     C0634            0    1                                        00664  00000 00001
   .     C0635            0    120                                      00665  00000 00014
   .     C0636 MNTHREG    0    100                                      00666  00000 00012  SET MONTH TO OCTOBER
   .     C0637 DAYMSG     FD   1*A                                      00667  06050 50505
   .     C0640            -0   DAYMSG1                                  00670  77777 00671
   .     C0641 DAYMSG1    F0   0*GREENWICH DAY(1-31)                    00671  14271 21223
                                                                        00672  34161 01505
                                                                        00673  11063 65161
                                                                        00674  41536 14005
   .     C0642            -0   -0                                       00675  77777 77777
   .     C0643 REPLY5     FD   1*0                                      00676  11050 50505
   .     C0644            11   DAYREG                                   00677  00011 00702
   .     C0645            0    0                                        00700  00000 00000
   .     C0646            0    310                                      00701  00000 00037
   .     C0647 DAYREG     0    0                                        00702  00000 00000  DAY OF THE MONTH
   .     C0650 MONTHTABLE 31D                                           00703  00000 00037  J      COMPUTE DAY OF YEAR
   .     C0651            28D                                           00704  00000 00034  F
   .     C0652            31D                                           00705  00000 00037  M
   .     C0653            30D                                           00706  00000 00036  A
   .     C0654            31D                                           00707  00000 00037  M
   .     C0655            30D                                           00710  00000 00036  J
   .     C0656            31D                                           00711  00000 00037  J
   .     C0657            31D                                           00712  00000 00037  A
   .     C0660            30D                                           00713  00000 00036  S
   .     C0661            31D                                           00714  00000 00037  0
   .     C0662            30D                                           00715  00000 00036  N
   .     C0663            31D                                           00716  00000 00037  0
   .     C0664 TIMEMSG    FD   1*A                                      00717  06050 50505
   .     C0665            -0   PRSNTIME                                 00720  77777 00721
   .     C0666 PRSNTIME   F0   0*0248 IS THE PRESENT GMT                00721  24626 47005
                                                                        00722  16300 53115
                                                                        00723  12052 52712
                                                                        00724  30122 33105
                                                                        00725  14223 10505
   .     C0667            -0                                           00726  77777 77777
   .     C0670 TIMERROR   TERM AZCHAN*OUTPUT                           00727  67540 00000
   .     C0671            TERM ELCHAN*OUTPUT                           00730  67500 00000
   .     C0672            TERM TAPE*OUTPUT                             00731  67640 00000
   .     C0673            TERM DATACHAN*INPUT                          00732  66240 00000
   .     C0674            RJP  U(INTERCOM)                             00733  65020 63426
   .     C0675            U-TAG     WHOABOY*0                          00734  00736 00000
   .     C0676            JP   L(MCPGM)                                00735  61010 63412
   .     C0677 WHOABOY    F0   1*A                                      00736  06050 50505
   .     C07C0            -0   HALT                                    00737  77777 00740
   .     C0701 HALT       FD   0*SYSTEM TIMING OUT OF SYNCH...MUST      00740  30363 03112
                               ABORT.
                                                                        00741  22053 11622
                                                                        00742  16231 40524
                                                                        00743  32310 52413
                                                                        00744  05303 62310
                                                                        00745  16757 57522
                                                                        00746  32303 10506
                                                                        00747  07242 73175
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SPURT OUTPUT NO. 210

TIMING J00*4/21/65

CARDS	LI ID	LABEL	TA	STATEMENT	LOC	F JKB Y	NOTES
.	C0702		-0		00750	77777 77777	
.	C0703	EXCEEDEOTM	FD	1*A	00751	06050 50505	
.	C0704		-0	$+1	00752	77777 00753	
.	C0705		FD	0*SYSTEM TIME LIMIT REACHED.	00753	30363 03112	
					00754	22053 11622	
					00755	12052 11622	
					00756	16310 52712	
					00757	06101 51211	
					0076C	75050 50505	
.	C0706		-0		00761	77777 77777	
.	C0707	MAXSECONDS	0000521377		00762	00005 21377	DEC 172799.80
.	C0710	TIMEJP	RILJP	TIMESIN	00763	60100 00636	
.	C0711	TIN	U-TAG	ACTUALTIME*ACTUALTIME	00764	63142 53142	
.	00712	DELAYTIME	D	100000	00765	00000 23420	EQUAL 2 SECONO IN 200 MS
.	C0713	TSUBZERO	0		00766	00000 00000	PRESENT GMT PLUS DELAY TIME
.	C0714	SECSNOW	0		00767	00000 00000	
.	C0715	MYSECONDS	0		0077C	00000 00000	
.	C0716	PHOURS	0		00771	00000 00000	
.	C0717	PMINS	0		00772	00000 00000	
.	C0720	RAWTTG	0		00773	00000 00000	
.	C0721	DUMHRS	0		00774	00000 00000	
.	C0722	DUMMINS	0		00775	00000 00000	
.	C0723	DUMSECS	0		00776	00000 00000	
.	C0724	DUM200TTG	0		00777	00000 00000	
.	C0725	EOFREWQ	FD	1*A	01000	06050 50505	
.	C0726		-0	$+1	01001	77777 01002	
.	C0727		FO	0*PRINT RESULTS NOW... YES(0) OR NO (1)	01002	25271 52331	
					01003	05271 23032	
					01004	21313 00523	
					01005	24347 57575	
					01006	05361 23051	
					01007	24400 52427	
					01010	05232 45161	
					01011	40050 50505	
.	C0730		-0		01012	77777 77777	
.	C0731	EOFREWA	FD	1*0	01013	11050 50505	
.	C0732		11	REWANS	01014	00011 01017	
.	C0733		0		01015	00000 00000	
.	C0734		1		01016	00000 00001	
.	C0735	REWANS	0		01017	00000 00000	
.	C0736	RUNTYPEQ	FO	1*A	01020	06050 50505	
.	C0737		-0	$+1	01021	77777 01022	
.	C0740		FO	0*TYPE OF RUN.... REAL TIME (0) OR SIMULATION (1)	01022	31362 51205	
					01023	24130 52732	
					01024	23757 57575	
					01025	05271 20621	
					01026	05311 52212	
					01027	05512 44005	
					01030	24270 53016	
					01031	22322 10631	
					01032	16242 30551	

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CARDS    LI IC LABEL      TA STATEMENT                                  LOC    F JKB Y      NOTES
                                                                       01033  61400 50505
    .    C0741            -0                                           01034  77777 77777
    .    C0742 RUNTYPEA   FD   1*D                                     01035  11050 50505
    .    C0743            11   RUNTYPEANS                              01036  00011 01041
    .    C0744            0                                            01037  00000 00000
    .    C0745            1                                            01040  00000 00001
    .    C0746 RUNTYPEANS 0                                            01041  00000 00000
    .    C0747 STARTUPQ   FD   1*A                                     01042  06050 50505
    .    C0750            -0   $+1                                     01043  77777 01044
    .    C0751            FD   10D*START... AS SOON AS POSSIBLE(0)01044  30310 62731
                               OR AT A SPECIFIED
                                                                       01045  75757 50506
                                                                       01046  30053 02424
                                                                       01047  23050 53005
                                                                       01050  25243 03016
                                                                       01051  07211 25124
                                                                       01052  40052 42705
                                                                       01053  06310 50605
                                                                       01054  30251 21016
                                                                       01055  13161 21105
    .    C0752            FD   0*GMT (1)                               01056  14223 10551
                                                                       01057  61400 50505
    .    C0753            -0                                           01060  77777 77777
    .    C0754 STARTUPA   FD   1*D                                     01061  11050 50505
    .    C0755            11   STARTUPANS                             01062  00011 01065
    .    C0756            0                                            01063  00000 00000
    .    C0757            1                                            01064  00000 00001
    .    C0760 STARTUPANS 0                                            01065  00000 00000
    .    C0761 REALKOQ    FD   1*A                                     01066  06050 50505
    .    C0762            -0   $+1                                     01067  77777 01070
    .    C0763            FD   0*SPECIFIC GMT START(HHMM)              01070  30251 21016
                                                                       01071  13161 00514
                                                                       01072  22310 53031
                                                                       01073  06273 15115
                                                                       01074  15222 24005
    .    C0764            -0                                           01075  77777 77777
    .    C0765 REALKOA    FD   1*D                                     01076  11050 50505
    .    C0766            11   HOURREG                                01077  00011 53151
    .    C0767            0                                            01100  00000 00000
    .    C077C            23590                                        01101  00000 04467
    .    C0771 MOTIONQ    FD   1*A                                     01102  06050 50505
    .    C0772            -0   $+1                                     01103  77777 01104
    .    C0773            FD   0*FICTITIOUS TIME.. INCREMENTED (0)01104  13161 03116
                               OR STATIONARY(1)
                                                                       01105  31162 43230
                                                                       01106  05311 62212
                                                                       01107  75750 51623
                                                                       01110  10271 22212
                                                                       01111  23311 21105
                                                                       01112  51244 00524
                                                                       01113  27053 03106
                                                                       01114  31162 42306
                                                                       01115  27365 16140
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CARDS    LI IC LABEL      TA STATEMENT                                    LOC    F JKB Y      NOTES

   .     C0774            -0                                              01116  77777 77777
   .     C0775 MOTIONA    FD   1*D                                        01117  11050 50505
   .     C0776            11   MOTIONANS                                  01120  00011 01123
   .     C0777            0                                               01121  00000 00000
   .     C10CC            1                                               01122  00000 00001
   .     C1001 MOTIONANS  0                                               01123  00000 00000
   .     C1002 FRSTSIMTMO FD   1*A                                        01124  06050 50505
   .     C1003            -0   $+1                                        01125  77777 01126
   .     C1004            FD   0*GMT FOR FIRST COMPUTED POINT(HHMM        01126  14223 10513
                          SS)
                                                                          01127  24270 51316
                                                                          01130  27303 10510
                                                                          01131  24222 53231
                                                                          01132  12110 52524
                                                                          01133  16233 15115
                                                                          01134  15222 23030
                                                                          01135  40050 50505
   .     C1005            -0                                              01136  77777 77777
   .     C1006 FRSTSIMTMA FD   1*D                                        01137  11050 50505
   .     C1007            11   RAWTTG                                     01140  00011 00773
   .     C101C            0                                               01141  00000 00000
   .     C1011            235959D                                         01142  00007 14667
   .     C1012 ADDAMTO    FD   1*A                                        01143  06050 50505
   .     C1013            -0   $+1                                        01144  77777 01145
   .     C1014            FD   0*INCREMENT TO GMT (IN SECONDS) FOR        01145  16231 02712
                           SUCCESSIVE POINTS
                                                                          01146  22122 33105
                                                                          01147  31240 51422
                                                                          01150  31055 11623
                                                                          01151  05301 21024
                                                                          01152  23113 04005
                                                                          01153  13242 70530
                                                                          01154  32101 01230
                                                                          01155  30163 31205
                                                                          01156  25241 62331
                                                                          01157  30050 50505
   .     C1015            -0                                              01160  77777 77777
   .     C1016 ADDAMTA    FD   1*D                                        01161  11050 50505
   .     C1017            11   DTVALUE                                    01162  00011 01165
   .     C1020            0                                               01163  00000 00000
   .     C1021            100000                                          01164  00000 25060
   .     C1022 DTVALUE    0                                               01165  00000 00000
   .     C1023 POWFASTO   FD   1*A                                        01166  06050 50505
   .     C1024            -0   $+1                                        01167  77777 01170
   .     C1025            FD   0*SYSTEM CYCLE TIME.. 1/4 SEC.(0)          001170 30363 03112
                          R 2 SEC.(1)
                                                                          01171  22051 03610
                                                                          01172  21120 53116
                                                                          01173  22127 57505
                                                                          01174  61746 40530
                                                                          01175  12107 55124
                                                                          01176  40052 42705
                                                                          01177  62053 01210
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CARDS    L1 ID LABEL       TA STATEMENT                                LOC    F JKB Y      NOTES

                                                                      01200  75516 14005
     .   C1026             -0                                        01201  77777 77777
     .   C1027 HOWFASTA     FD   1*D                                  01202  11050 50505
     .   C1030              11   FASTORSLOW                           01203  00011 01206
     .   C1031              0                                         01204  00000 00000
     .   C1032              1                                         01205  00000 00001
     .   C1033 FASTORSLOW   0                                         01206  00000 00000
     .   C1034 INITTMQ      FD   1*A                                  01207  06050 50505
     .   C1035              -0   $+1                                  01210  77777 01211
     .   C1036              FD   0*INITIAL CHOICE OF GMT(HHMMSS)      01211  16231 63116
                                                                      01212  06210 51015
                                                                      01213  24161 01205
                                                                      01214  24130 51422
                                                                      01215  31511 51522
                                                                      01216  22303 04005
     .   C1037              -0                                        01217  77777 77777
     .   C1040              RESERVE   1                               01220  00000 00000
                                                                      01221  00002 50600
                                                                      01222  12300 00004
                                                                      01223  30100 00004
                                                                      01224  40000 00000
                                                                      01225  05272 45200
                                                                      01226  31577 45000

END OF LISTING
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TIMING JDD*4/21/65

LABEL	LOC	LABEL	LOC	LABEL	LOC
A$$$$$1111	01221	A$$$$$1112	01222	A$$$$$1113	01223
A$$$$$1114	01224	A$$$$$1115	01225	A$$$$$1116	01226
ACQAZIM	63071	ACQFLEV	63075	ACQUI	63427
ACTUALTIME	63142	ADDAMTA	01161	ADDAMTQ	01143
ADDAY	00274	ADJUSTTIME	00277	AOSCN	63416
AEBOXLINES	63507	AESCN	63417	ALNGOFFSET	63517
ALNGACRSCN	63506	ARCOFAZIM	63524	ARCOFDEC	63526
ARCOFELEV	63522	ARCOFRA	63530	ASKRUNTYPE	00125
ASKSTARTUP	00134	ASTRODEC	63106	ASTRORA	63105
AUPEREQUAT	63341	AZOIFS	63120	AZELOTIME	63532
AZELRXSCAN	63500	AZIM	63053	AZIMOFFSET	63512
AZIMOUT	64000	AZIMOVER	63325	AZIMADD	63442
AZIMIN	75000	AZMTHSCAN	63501	BODYSIZE	63462
BATCHBUFLP	00350	BACKTOMCP	00560	BACKTOREAL	00352
BACKTOTOP	00412	BCWOUTAZ	00501	BLASTOFF	63146
COCON	63414	COMPTRATE	00201	CONVERTIME	63135
CORCT	63420	COSORIENT	63065	COSAZEL	63070
CAZIM	63060	CELBODY	63116	CELCOMPGM	63424
CELEV	63061	CELTIME	63133	CHCOR	63422
CHPAR	63431	CRANGE	63057	CRSSOFFSET	63516
CONTASKIT	00152	DOPPOUT	66000	DOPPAOD	63444
DATANALYZE	63425	DAY	63150	DAYBII	00563
DAYMSG	00667	DAYMSG1	00671	DAYREG	00702
DAYSPRAURT	00561	DEC	63003	DECOFFSET	63515
DECOOT	63010	DECLINSCAN	63505	DELAYTIME	00765
DELTATOGMT	00165	DELTATEE	63316	DELTIME	00627
DSECONDS	63141	DTVALUE	01165	DUM200TTG	00777
DUMHRS	00774	DUMMINS	00775	DUMSECS	00776
DUMSECTTG	63154	DYOMP	63421	EOFREWA	01013
EOFREWQ	01000	ELDIFS	63121	ELEV	63054
ELEVOFFSET	63513	ELEVOUT	65000	ELEVAOD	63443
ELEVIN	76000	ELVTNSCAN	63502	EQUATOR	63323
ESTARTIME	00257	ESTSHIFTED	63143	EXCEEDEDTM	00751
EXPNAME	63350	FORDAY	00011	FORHJF	00013
FORMONTH	00007	FASTORSLOW	01206	FILEDONE	00405
FIRSTELEV	63104	FIRSTHRU	63153	FIXMONTH	00435
FLATTENING	63337	FRAMESIZE	63101	FREQUENCY	63317
FRSTINCRTM	00163	FRSTSIMTMA	01137	FRSTSIMTMQ	01124
FRSTSTATIM	00214	GEOCENLAT	63322	GEODETLAT	63321
GMTADD24	63145	GMTSHIFTED	63144	HOLONOHOLD	63511
HOURMINUTE	63137	HOURREG	63151	HOWFASTA	01202
HOWFASTQ	01166	HALT	00740	HEIGHT	63326
ID10RADIO	66777	ID11RADIO	67776	ID12RADIO	67777
ID13RADIO	70775	ID14RADIO	70776	ID15RADIO	71776
ID15RADIO	71777	ID17RADIO	72776	ID18RADIO	72777
ID19RADIO	73776	IDICELCOR	63000	IDIENTPNT	63410
IDIRADCOR	63050	IDIRAOIO	63440	IDIRECRD	63210
IDISYSENT	77576	IDISYSNAM	77676	IDISYSPAR	63310
IDITIME	63130	I020RADIO	73777	ID2IRAOIO	74776
ID22RADIO	74777	ID23RADIO	75776	ID24RADIO	75777
ID25RADIO	76775	ID26RAOIO	76776	ID2CELCOR	63001

..... SPURT OUTPUT NO. 211 .....

TIMING JDD*4/21/65

LABEL	LOC	LABEL	LOC	LABEL	LOC
ID2ENTPNT	63411	ID2RAOCOR	63051	I02RAOIO	63441
ID2RECRD	63211	ID2SYSENT	77577	I02SYSNAM	77677
ID2SYSPAR	63311	ID2TIME	63131	I03RAOIO	63776
ID4RADIO	63777	ID5RAOIO	64776	I06RAOIO	64777
ID7RADIO	65776	IDBRADIO	65777	I09RAOIO	66776
INAZIMADD	63446	INBUFRLOOP	00357	INOEXOAY	00415
INELEVADO	63447	INITTMQ	01207	INTER	63413
INTERAZIM	72000	INTERCOM	63426	INTERODPP	74000
INTERELEV	73000	INTERLCKSW	63460	INTERRANGE	76777
ISAS1MRUN	0D144	KMPERNM	63342	KYBRDLEVEL	63110
LONGITUDE	63320	LSPERAU	63336	MONTHTABLE	00703
MOTIONA	01117	MOTIONANS	01123	MOTIONQ	01102
MAINSWITCH	63334	MAXSECONDS	00762	MCPFILLER	71000
MCPGM	63412	MILLSTNADD	63451	MINREG	63152
MNTHMSG	00652	MNTHMSG1	00654	MNTHREG	00666
MSFREQ	63332	MYSECONDS	00770	NORMALINIT	0D005
NORMALTME	0D252	NOTPLANING	00215	NOXING	00123
NEWSGMT	00626	NEWTMANS	00622	NEWTMQUES	00606
NEXTTIME	00305	NMPERAU	63340	POLE	63324
PERIODAZIM	63523	PERIODDEC	63525	PERIODELEV	63521
PERIODRA	63527	PHOURS	00771	PLOTP	63436
PLANP	63434	PMINS	00772	PREVIOUSTM	63461
PRINRECSW	63160	PRLOG	63423	PRSNTIME	00721
RA	63002	RAOFFSET	63514	RADOT	63007
RADARMODE	63312	RADCBXSCAN	63503	RAOECOTIME	63531
RADIODEC	63541	RAOIOMETER	63102	RAOIORA	63540
RADINDIC	63157	RADIUS	63006	RAOIUSOOT	63011
RANGE	63052	RANGEOUT	70777	RANGEADD	63445
RANGEDOT	63062	RASCTNSCAN	63504	RAWTTG	00773
RDOTDIFS	63123	RDBOXLINES	63510	ROIFS	63122
RDMTR	63430	RDXXX	63433	REAOCLOCK	00630
REALKOA	01076	REALKOQ	01066	RECOROSIZE	63112
RECAZIM	67000	RECELEV	70000	RECFILE	63212
RECRD	63415	RECRDSWTCH	63155	RELEASESW	63156
REPLY4	00662	REPLY5	00676	REWANS	01017
RUNLENGTH	00605	RUNTIMEA	00601	RUNTIMEQ	00572
RUNTYPEA	01035	RUNTYPEANS	01041	RUNTYPEQ	01020
SAZIM	63055	SCELTIME	63134	SOEC	63005
SECONDS	63140	SECSNOW	00767	SELEV	63056
SIDERTIME	63012	SINORIENT	63064	SINAZEL	63066
SIXSECBIT	00562	SKIP	63331	SLAVE	63126
SLAVEOPTS	63124	SLAVEMODES	63125	SRA	63004
SRADTIME	63136	STANDSTILL	00210	STARTUPA	01061
STARTUPANS	01065	STARTUPQ	01042	STATORINCR	00156
STILLTIME	0D503	SUBMONTH	00430	SYNCTIMING	63542
SYSCOMREG1	63452	SYSCOMREG2	63453	SYSCOMREG3	63454
SYSCOMREG4	63455	SYSCOMREG5	63456	SYSCOMREG6	63457
SYSENTRIES	77600	SYSNAMES	77700	SYSTAT1	63313
SYSTAT2	63314	SYSTATD	63315	TELLXED	00332
TEMP	00565	TIMECORR	63107	TIMEDELTA	00564
TIMEJP	00763	TIMELOCKED	00546	TIMEMODE	63103

..... SPURT OUTPUT NO. 211 .....

TIMING J00*4/21/65

LABEL	LOC	LABEL	LOC	LABEL	LOC
TIMEMSG	00717	TIMENOW	00050	TIMEP	63435
TIMERROR	00727	TIMES3	00245	TIMESIN	00636
TIMETOHOLD	63520	TIMEXCEED	00370	TIMING	00000
TIN	00764	TMINIT	00002	TMRUN	00347
TRUERANGE	63063	TRUETIME	63132	TSUBZERO	00766
TTYSTATUS	63111	TWOSECOOP	63017	VELOFLIGHT	63335
VIZDEC1	63014	VIZDEC2	63016	VIZRA1	63013
VIZRA2	63015	WATCHDOG	00545	WFORD	63432
WFADD	63450	WFFREQ	63333	WHOABOY	00736
WHERTOGO	00414	YEARMONTH	63147	YEARREG	00651
YRTRAN	63327	ZRTRAN	63330		

END OF LISTING

..... SPURT OUTPUT NO. 212 .....

TIMING JOD*4/21/65

LABEL	LOC	LABEL	LOC	LABEL	LOC
TIMING	00000	TMINIT	00002	NORMALINIT	00005
FORMONTH	00007	FOROAY	00011	FORHJF	00013
TIMENOW	00050	NOXING	00123	ASKRUNTYPE	00125
ASKSTARTUP	00134	ISASIMRUN	00144	OONTASKIT	00152
STATORINCR	00156	FRSTINCRTM	00163	OELTATOGMT	00165
COMPTRATE	00201	STANOSTILL	00210	FRSTSTATIM	00214
NOTPLANING	00215	TIMES3	00245	NORMALTME	00252
ESTARTIME	00257	AODAY	00274	AOJUSTTIME	00277
NEXTTIME	00305	TELLXEO	00332	TMRUN	00347
B4INBUFLP	00350	BACKTOREAL	00352	INBUFRLOOP	00357
TIMEXCEED	00370	FILEOONE	00405	BACKTOTOP	00412
WHERTOGO	00414	INOEXOAY	00415	SUBMONTH	00430
FIXMONTH	00435	BCWOUTAZ	00501	STILLTIME	00503
WATCHOOG	00545	TIMELOCKEO	00546	BACKTOMCP	00560
DAYSPRAURT	00561	SIXSECB11	00562	OAYB11	00563
TIMEDELTA	00564	TEMP	00565	RUNTIMEQ	00572
RUNTIMEA	00601	RUNLENGTH	00605	NEWTMQUES	00606
NEWTMANS	00622	NEWSGMT	00626	OELTIME	00627
READCLOCK	00630	TIMESIN	00636	YEARREG	00651
MNTHMSG	00652	MNTHMSG1	00654	REPLY4	00662
MNTHREG	00666	OAYMSG	00667	OAYMSG1	00671
REPLY5	00676	OAYREG	00702	MONTHTABLE	00703
TIMEMSG	00717	PRSNTIME	00721	TIMERROR	00727
WHOABOY	00736	HALT	00740	EXCEEOEOTM	00751
MAXSECONDS	00762	TIMEJP	00763	TIN	00764
DELAYTIME	00765	TSUBZERO	00766	SECSNOW	00767
MYSECONOS	00770	PHOURS	00771	PMINS	00772
RAWTTG	00773	OUMHRS	00774	OUMMINS	00775
OUMSECS	00776	OUM2OOTTG	00777	EOFREWQ	01000
EOFREWA	01013	REWANS	01017	RUNTYPEQ	01020
RUNTYPEA	01035	RUNTYPEANS	01041	STARTUPQ	01042
STARTUPA	01061	STARTUPANS	01065	REALKOQ	01066
REALKOA	01076	MOTIONQ	01102	MOTIONA	01117
MOTIONANS	01123	FRSTSIMTMQ	01124	FRSTSIMTMA	01137
AODAMTQ	01143	AODAMTA	01161	OTVALUE	01165
HOWFASTQ	01166	HOWFASTA	01202	FASTORSLOW	01206
INITTMQ	01207	A$$$$$1111	01221	A$$$$$I112	01222
A$$$$$1113	01223	A$$$$$1114	01224	A$$$$$1115	01225
A$$$$$1116	01226	ID1CELCOR	63000	ID2CELCOR	63001
RA	63002	OEC	63003	SRA	63004
SDEC	63005	RADIUS	63006	RAOOT	63007
OECOOT	63010	RAOIUSOOT	63011	SIOERTIME	63012
VIZRA1	63013	VIZOEC1	63014	VIZRA2	63015
VIZOEC2	63016	TWOSECOOP	63017	IOIRAOCOR	63050
ID2RADCOR	63051	RANGE	63052	AZIM	63053
ELEV	63054	SAZIM	63055	SELEV	63056
CRANGE	63057	CAZIM	63060	CELEV	63061
RANGEOOT	63062	TRUERANGE	63063	SINORIENT	63064
COSORIENT	63065	SINAZEL	63066	COSAZEL	63070
ACOAZIM	63071	ACOELEV	63075	FRAMESIZE	63101
RADIOMETER	63102	TIMEMOOE	63103	FIRSTELEV	63104

..... SPURT OUTPUT NO. 212 .....

TIMING JDD*4/21/65

LABEL	LOC	LABEL	LOC	LABEL	LOC
ASTRORA	63105	ASTRODEC	63106	TIMECORR	63107
KYBRDLEVEL	63110	TTYSTATUS	63111	RECORDSIZE	63112
CELBODY	63113	AZDIFS	63120	ELDIFS	63121
RDIFS	63122	RDOTDIFS	63123	SLAVEOPTS	63124
SLAVEMODFS	63125	SLAVE	63126	IDITIME	63130
ID2TIME	63131	TRUETIME	63132	CELTIME	63133
SCELTIME	63134	CONVERTIME	63135	SRADTIME	63136
HOURMINUTE	63137	SECONDS	63140	DSECONDS	63141
ACTJALTIME	63142	ESTSHIFTED	63143	GMTSHIFTED	63144
SATMODU24	63145	BLASTOFF	63146	YEARMONTH	63147
DAY	63150	HOURREG	63151	MINREG	63152
FIRSTHRU	63153	DUMSECTTG	63154	RECRDSWTCH	63155
RELEASESW	63156	RADINDIC	63157	PRINRECSW	63160
ID1RECRD	63210	ID2RECRD	63211	RECFILE	63212
ID1SYSPAR	63310	ID2SYSPAR	63311	RADARMODE	63312
SYSTAT1	63313	SYSTAT2	63314	SYSTATD	63315
DELTATEE	63316	FREQUENCY	63317	LONGITUDE	63320
GEODETLAT	63321	GEOCENLAT	63322	EQUATOR	63323
POLE	63324	AZIMOVER	63325	HEIGHT	63326
YRTRAN	63327	ZRTRAN	63330	SKIP	63331
MSFREQ	63332	WFFREQ	63333	MAINSWITCH	63334
VELOFLIGHT	63335	LSPFRAU	63336	FLATTENING	63337
KMPERAU	63340	AUPEREQUAT	63341	KMPERNM	63342
EXPNAME	63350	IDIENTPNT	63410	IO2ENTPNT	63411
MCPGM	63412	INTER	63413	COCON	63414
RECRD	63415	ADSCN	63416	AESCN	63417
CORCT	63420	OYDMP	63421	CHCOR	63422
PRLOG	63423	CELCOMPGM	63424	DATANALYZE	63425
INTERCOM	63426	ACQUI	63427	RDMTR	63430
CHPAR	63431	WFORD	63432	ROXXX	63433
PLANP	63434	TIMEP	63435	PLOTP	63436
IDIRADIO	63440	ID2RADIO	63441	AZIMADD	63442
ELEVADD	63443	DOPPADD	63444	RANGEADD	63445
INAZIMADD	63446	INELEVADD	63447	WFADD	63450
MILLSTNADD	63451	SYSCOMREG1	63452	SYSCOMREG2	63453
SYSCOMREG3	63454	SYSCOMREG4	63455	SYSCOMREG5	63456
SYSCOMREG6	63457	INTERLCKSW	63460	PREVIOUSTM	63461
BODYSIZE	63462	AZELBXSCAN	63500	AZMTHSCAN	63501
ELVTNSCAN	63502	RADCBXSCAN	63503	RASCTNSCAN	63504
DECLINSCAN	63505	ALNGACRSCN	63506	AEBOXLINES	63507
RDBOXLINES	63510	HOLDNOHOLD	63511	AZIMOFFSET	63512
ELEVOFFSET	63513	RADFFSET	63514	DECOFFSET	63515
CRSSOFFSET	63516	ALNGOFFSET	63517	TIMETOHOLD	63520
PERIODELEV	63521	ARCOFELEV	63522	PERIODAZIM	63523
ARCOFAZIM	63524	PERIODDEC	63525	ARCOFDEC	63526
PERIODRA	63527	ARCOFRA	63530	RADECOTIME	63531
AZELOTIME	63532	RADIORA	63540	RADIODEC	63541
SYNCTIMING	63542	ID3RADIO	63776	ID4RADIO	63777
AZIMOUT	64000	ID5RADIO	64776	ID6RADIO	64777
ELEVOUT	65000	ID7RADIO	65776	ID8RADIO	65777
DOPPOUT	66000	ID9RADIO	66776	ID10RADIO	66777

..... SPURT OUTPUT NO. 212 .....

TIMING JDD•4/21/65

LABEL	LOC	LABEL	LOC	LABEL	LOC
RECAZIM	67D00	ID11RADID	67776	ID12RADID	67777
RECELEV	70000	ID13RADID	7D775	ID14RADID	70776
RANGEDUT	7D777	MCPFILLER	71D00	ID15RADID	71776
ID16RADID	71777	INTERAZIM	72D00	ID17RADID	72776
ID18RADID	72777	INTERELEV	73000	ID19RADID	73776
ID20RADID	73777	INTERDOPP	74000	ID21RADID	74776
ID22RADID	74777	AZIMIN	75DDD	ID23RADID	75776
ID24RADID	75777	ELEVIN	76DDD	ID25RADID	76775
ID26RADID	76776	INTERRANGE	76777	ID1SYSENT	77576
ID2SYSENT	77577	SYSENTRIES	77600	ID1SYSNAM	77676
ID2SYSNAM	77677	SYSNAMES	777DD		

END OF LISTING

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13. ABSTRACT

The Haystack Pointing System, implemented on the Univac 490 computer, is comprised of some thirty odd subprograms which go to make up an operating system and a utility system. The domain of this memorandum is limited to the description of the control of the operating system as vested in the master control and timing programs and in the computer itself via its external and internal interrupt capabilities. In the discussion of the programmed control function are included the real-time and simulation modes of the system, the man-machine communication scheme, the experiment set-up procedures, a step by step description of the entire system cycle, the plug-in program concept as utilized in connection with the celestial computation programs and data processing programs as well as other system facets as they relate to control.

In addition, certain procedural matters which bear on the control structure are discussed.

14. KEY WORDS

Haystack Pointing System
Univac-490
magnetic tape
man-machine
SPURT
Intercom
data processing